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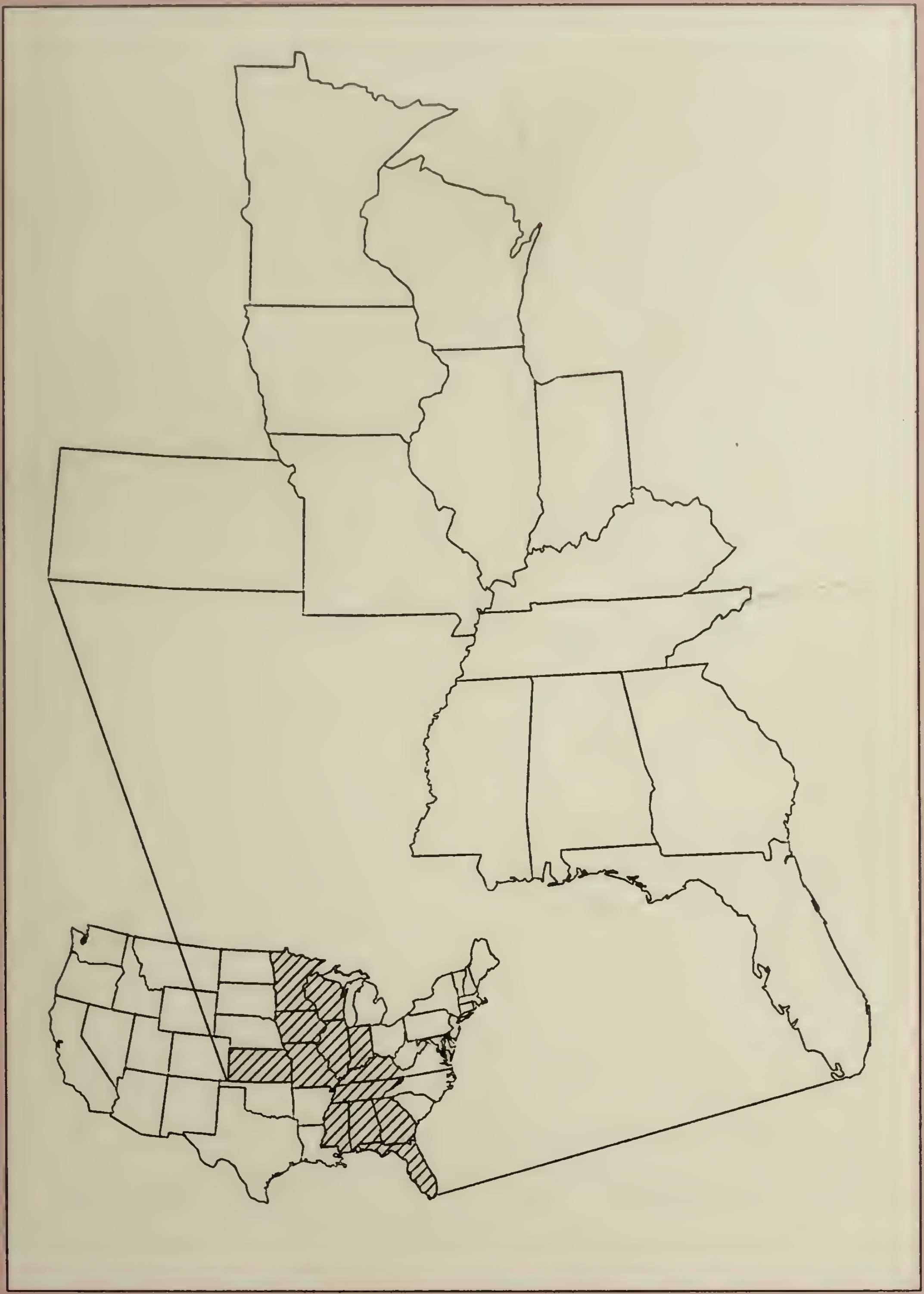
THE DEMAND FOR ENERGY IN THE ILLINOIS COAL MARKET



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THE DEMAND FOR ENERGY IN THE ILLINOIS COAL MARKET

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AT URBANA-CHAMPAIGN

for:

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Springfield, Illinois 62704-1892

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NOTE

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TABLE OF CONTENTS

Page

INTRODUCTION 1

CHAPTER ONE: PRODUCTION AND CONSUMPTION OF ILLINOIS COAL 5

CHAPTER TWO: ALABAMA 15
  Tennessee Valley Authority-Alabama 21

CHAPTER THREE: FLORIDA 27
  Gulf Power Company 33
  Seminole Electric Cooperative Incorporated 39
  Tampa Electric Company 43

CHAPTER FOUR: GEORGIA 49
  Georgia Power Company 55

CHAPTER FIVE: ILLINOIS 67
  Central Illinois Light Company 73
  Central Illinois Public Service Company 79
  Commonwealth Edison Company 87
  Electric Energy Incorporated 97
  Illinois Power Company 101
  Southern Illinois Power Cooperative 109
  Springfield City Water, Light and Power Department 113

CHAPTER SIX: INDIANA 117
  Hoosier Energy Rural Electric Cooperative 123
  Northern Indiana Public Service Company 127
  Public Service Company of Indiana 133

CHAPTER SEVEN: IOWA 141
  Eastern Iowa Light and Power Cooperative 145
  Interstate Power Company 149
  Iowa Electric Light and Power Company 155
  Iowa-Illinois Gas and Electric Company 161
  Iowa Southern Utilities Company 167
  Muscatine Power and Water Department 173

CHAPTER EIGHT: KANSAS 177
Kansas City Board of Public Utilities 181

CHAPTER NINE: KENTUCKY 185
Tennessee Valley Authority-Kentucky 189

CHAPTER TEN: MINNESOTA 193
Rochester Department of Public Utilities 199

CHAPTER ELEVEN: MISSISSIPPI 203
Mississippi Power Company 207

CHAPTER TWELVE: MISSOURI 213
Associated Electric Cooperative Incorporated 219
Central Electric Power Cooperative 223
Kansas City Power and Light Company 227
Sikeston Board of Municipal Utilities 233
Union Electric Company 237
Utilicorp United Incorporated 243

CHAPTER THIRTEEN: TENNESSEE 247
Tennessee Valley Authority-Tennessee 251

CHAPTER FOURTEEN: WISCONSIN 261
Dairyland Power Cooperative 265
Madison Gas and Electric Company 271
Wisconsin Electric Power Company 275

CHAPTER FIFTEEN: SUMMARY 281

BIBLIOGRAPHY 309

INTRODUCTION

Illinois is the fifth largest coal producing state in the nation, with about 62 million tons, representing seven percent of the nation's total. Kentucky is the largest state producer, followed by Wyoming, West Virginia and Pennsylvania. Illinois' coal production is dominated by a few large coal operators who account for most of the output. Peabody Coal Company continues to be the largest Illinois and U.S. coal producer. Of the remaining top ten Illinois coal producers, many are also large national coal producers.

Illinois coal mines are large in size and realize economies of scale. This implies that as Illinois coal mines increase their production, their average cost of production decreases. On average, Illinois' 20 largest underground mines produce over 1.7 million tons per year and the seven largest surface mines average 2.4 million tons per year. As for sales, many of these mines have less than three buyers for their coal, while some mines are dedicated to only one buyer. In the event that coal contracts are not renewed or cancelled, many coal producers may have to close their mines. Most acid rain studies do not take into account the loss of a major coal buyer and its impact on the economies of scale realized at these large mine sites. In many cases, a fifty percent reduction in sales could mean the closing of a mine because of the increased production costs and the inability to recover this cost in its coal price.

Historically, utilities have utilized high sulfur coal because of its heating value, delivered price and localized availability. In return for a guaranteed quantity and quality of coal from coal producers, utilities were willing to sign long-term contracts. Generally, this time period was for the useful life of the coal-fired generating station since a boiler was designed to burn a certain quality of coal and any variation in coal quality could reduce its economic and operational performance.

Since the early 1970's, utilities have been required to meet more strict air quality standards. These standards forced utilities to either install expensive environmental control technologies to remove a portion of the pollutant, or burn a coal that had a lower sulfur content. The availability of these "compliance" coals is primarily limited to the central Appalachian area; Wyoming; Montana; Colorado; and Utah. Most utilities chose to use a compliance coal to meet these stricter environmental standards. However, with the U.S. Environmental Protection Agency's Revised New Source Performance Standard of 1979, utilities have to install control technologies no matter the sulfur content of the coal.

Today, the market for Illinois coal is comprised of a 13 state region shown in Map 1-1. However, the top eight states purchase 99 percent of the total. These states include Illinois, Missouri, Indiana, Georgia, Florida, Tennessee, Iowa and Wisconsin. The states of Mississippi, Kansas, Alabama, Minnesota and Kentucky purchase the remainder. Over the last three years, utiltiy sales have remained about the same at 56 million tons per year.

Of the 33 electric utilities that use Illinois coal, the top ten consume approximately 80 percent of the total. Seven of these utilities are located outside of Illinois. The largest users of Illinois coal are Union Electric Company with 17 percent of total receipts; followed by Illinois Power Company with 12 percent; Public Service Company of Indiana at 11 percent; Georgia Power Company with ten percent; and Central Illinois Public Service Company at seven percent.

Clearly, two of the major marketing problems facing Illinois coal producers that must be addressed in the future are the sulfur content and the mine price of coal. Both problems have crippled the marketability of Illinois coal in many parts of the United States. Fortunately, even with the uncertainty surrounding federal acid rain legislation and with many states tightening their air pollution standards, Illinois utility sales have held their own. However, these problems, unless alleviated, will jeopardize future sales.

To overcome the sulfur problem, greater research and development of technologies that burn coal economically and in an environmentally safe manner have been undertaken. Improvements in mechanical coal cleaning techniques and chemical coal cleaning offer alternatives for pre-combustion technologies. A wider selection of combustion and post combustion technologies such as atmospheric and pressurized fluidized bed combustion; limestone furnace sorbent injection; coal gasification-combined cycle; clean fuel reburning; low NOx burners; and selective catalytic reduction offer other alternatives. Finally, improvements in flue gas desulfurization systems will provide the utility industry with alternatives in meeting the U.S. Environmental Protection Agency's Revised New Source Performance Standard and mandated air emission reductions at the state level.

The second problem, the mine price of coal, has also been confronted. Since the utility industry is concerned with the delivered price of coal, any price reduction at the mine site should affect the delivered price. Today, the coal industry is very competitive, primarily because of the over-supply of coal and weak demand for coal. Illinois coal producers find more and more coals competing in what has been considered the Illinois coal market. Many of the coal producers are selling a low sulfur coal at a very competitive price. To compete, Illinois coal producers have reduced the mine price through increased mine efficiency. This increase is the result of reduced employment and more efficient use of capital equipment.

Other problems impacting coal sales are the weak demand for electricity in the Illinois coal market. Many utilities are seeing minimal growth in their service territory, which translates into less demand for coal by present and future coal-fired capability. Also, the increase in nuclear generation has impacted the use of present coal-fired generation. As more and more nuclear stations come on line, there will be continued reductions in the demand for Illinois coal. As an example, Commonwealth Edison Company has reduced its Illinois coal consumption at its only station that uses Illinois coal by 43 percent.

THE DEMAND FOR ENERGY IN THE ILLINOIS COAL MARKET is a study of the electric utility market for coal mined in Illinois for 1986. This analysis is a companion guide to the 1984 study of Illinois coal producers, titled, **"An Historical Perspective on Illinois Coal Resources and Production, 1960-1984."**

This report analyzes the 33 electric utilities with generating stations greater than 50 megawatts in capacity, that purchased Illinois coal in 1986. Only electric utilities are analyzed since they consume nearly 90 percent of Illinois' annual coal production, or about 57 million tons. The remainder of sales are primarily to the industrial sector.

The report contains information on each of the 13 states where these utilities are located and provides Illinois coal sales data since 1981. It lists the competing fuels that are used in these states. Data on nuclear fuel purchases and consumption are not available, but the study does include information on nuclear capability, both present and future. Utility data covering a general description of the company, generating statistics and coal data are also included.

The study does analyze the future of the Illinois coal market and provides the reader with a database on current and future baseload generating capability. What the study shows is the current coal market and how the market will continue to shrink as the present coal-fired capability is retired. As the future demand for Illinois coal decreases, new coal-fired capability will not displace current capability because of the minimal increase in electrical demand and the displacement of some capability with nuclear power.

The study is divided into an introduction and 15 chapters. Chapter One discusses the Illinois coal industry and contains general information on the supply and demand for Illinois coal. The chapter includes a discussion of Illinois coal production for 1986, mine value and employment. Chapter One includes data on the ten largest Illinois coal producers and their percent of production. The Illinois coal market is discussed and a map of the market is presented. Coal consuming states and utilities, quantity and quality of Illinois coal and delivered prices are also shown. The chapter concludes with a discussion of the quantity of Illinois coal burned, by boiler type and age of facility.

Chapters Two through Fourteen detail the thirteen states with generating stations that use coal mined in Illinois. Each chapter discusses the demand for coal, petroleum and natural gas, including quantity, BTU value and delivered price. Each chapter includes data on generating capability, by fuel type; future baseload capability (including in-service date); net generation by fuel type; coal suppliers, and quantity and quality and price of coal; and Illinois coal receipts since 1981. Included with each state narrative is a map showing the locations of the coal-fired stations.

Following the state perspective is an analysis of the electric utilities in that state using Illinois coal. This section discusses the utility's service territory; electric sales; coal-fired capability; net generation; coal receipts, by quantity and quality and delivered price since 1983; coal-fired generation statistics; major coal suppliers to include contract expiration dates, if available; and mode of transportation. A table at the end of each section supplements the information provided in the narrative.

Chapter Fifteen contains the major findings of the report. Included in this chapter is an overall analysis, including graphs of the more important considerations of the study. Chapter Fifteen summarizes the current market for Illinois coal and discusses the potential for future market demand and risks to the Illinois coal market.

CHAPTER ONE

PRODUCTION AND CONSUMPTION OF ILLINOIS COAL

ILLINOIS COAL PRODUCTION

Illinois coal producers mined approximately 63 million tons of coal in 1986, an increase of about three million tons over 1985. The majority of the coal had a sulfur content greater than 2.5 percent, while only six percent of the coal was classified as a low sulfur coal.

The coal production had a mine value of approximately $1.9 billion. Mine employment was about 13,500. Compared to the previous year, the mine value of the coal was nearly the same, while mine employment decreased by almost 1,300. The primary reasons why the revenue stayed the same were reduced prices brought on by a surplus of coal, renegotiated coal contracts and an increase in spot market coal purchases. The reduced mine employment resulted from a more competitive coal market and improvements in production efficiency. From 1985, the average production per mine employee per man-day increased by about ten percent.

Nearly 65 percent of the production was taken from 31 underground mines and the remainder from 20 surface mines. The largest underground mine was Monterey Coal Company's Mine No. 2 with 3.3 million tons. The largest surface mine was Arch of Illinois' Captain Mine with 6.3 million tons. Overall, underground mines had an average production of 1.3 million tons and the surface mines averaged 1.1 million tons. The 51 mines were operated by 22 coal companies, of which the top ten producers mined 58 million tons, or 92 percent of the total.

Peabody Coal Company continues to be the largest Illinois coal producer with 16 percent of production. Due to recent expansion in operations, Consolidation Coal Company and Arch Mineral Corporation are a close second and third with about 16 percent and 14 percent, respectively. Consolidation purchased Inland Steel Coal Company's two operating mines in southern Illinois, while Arch Mineral purchased Amax Coal Company's Leahy Mine in southern Illinois and opened the Horse Creek Mine near Pinckneyville.

Table 1-1 lists the top ten Illinois coal producers, their coal production and percent of total Illinois coal production. This list has remained about the same in recent years. New additions to the list are Kerr-McGee Coal Corporation and White County Coal Corporation.

TABLE 1-1. ILLINOIS COAL PRODUCERS, COAL PRODUCTION AND PERCENT OF ILLINOIS COAL PRODUCTION.

COMPANY	TONS (000)	% OF TOTAL
PEABODY COAL	10,175	16.1
CONSOLIDATION COAL	9,986	15.8
ARCH MINERAL	8,639	13.6
OLD BEN COAL	8,033	12.7
MONTEREY COAL	5,321	8.4
FREEMAN UNITED COAL	5,124	8.1
AMAX COAL	4,473	7.1
ZEIGLER COAL	2,992	4.7
KERR-MCGEE COAL	1,980	3.2
WHITE COUNTY COAL	1,463	2.4
ALL OTHERS	5,047	7.9
TOTAL	63,233	100.0

ILLINOIS COAL MARKET

The Illinois utility coal market is comprised of 13 states, located in the midwestern and southeastern United States. Outside of Illinois, Missouri utilities continue to be the largest consumers of Illinois coal with 23 percent of the total, followed by Indiana and Georgia. Utilities from the top five states purchased about 50 million tons, or 87 percent of utility sales. In recent years, approximately 90 percent of sales have been to the electric utility industry. Map 1-1 shows the Illinois utility coal market by state and quantity purchased in millions of tons.

Table 1-2 lists the 13 states where Illinois coal is consumed. The table contains information for electric utility sales only. Shown in the table are: the tons of coal purchased by electric utilities in each state; the percent of total electric sales; the average BTU content per pound of coal; percent sulfur, by weight; delivered price per ton; and cost in dollars per million BTU. Examination of the BTU content and sulfur content reveals that the better quality Illinois coal is exported. On a cost per million BTU basis, the delivered price of Illinois coal was the lowest to Tennessee at $1.23 per million BTU, while the most expensive was to Florida at $2.12 per million BTU. The average cost per million BTU dropped by three cents from $1.66 in 1985 to $1.63 in 1986. Utility coal sales also increased by five percent from the previous year.

MAP 1-1
ILLINOIS UTILITY COAL MARKET

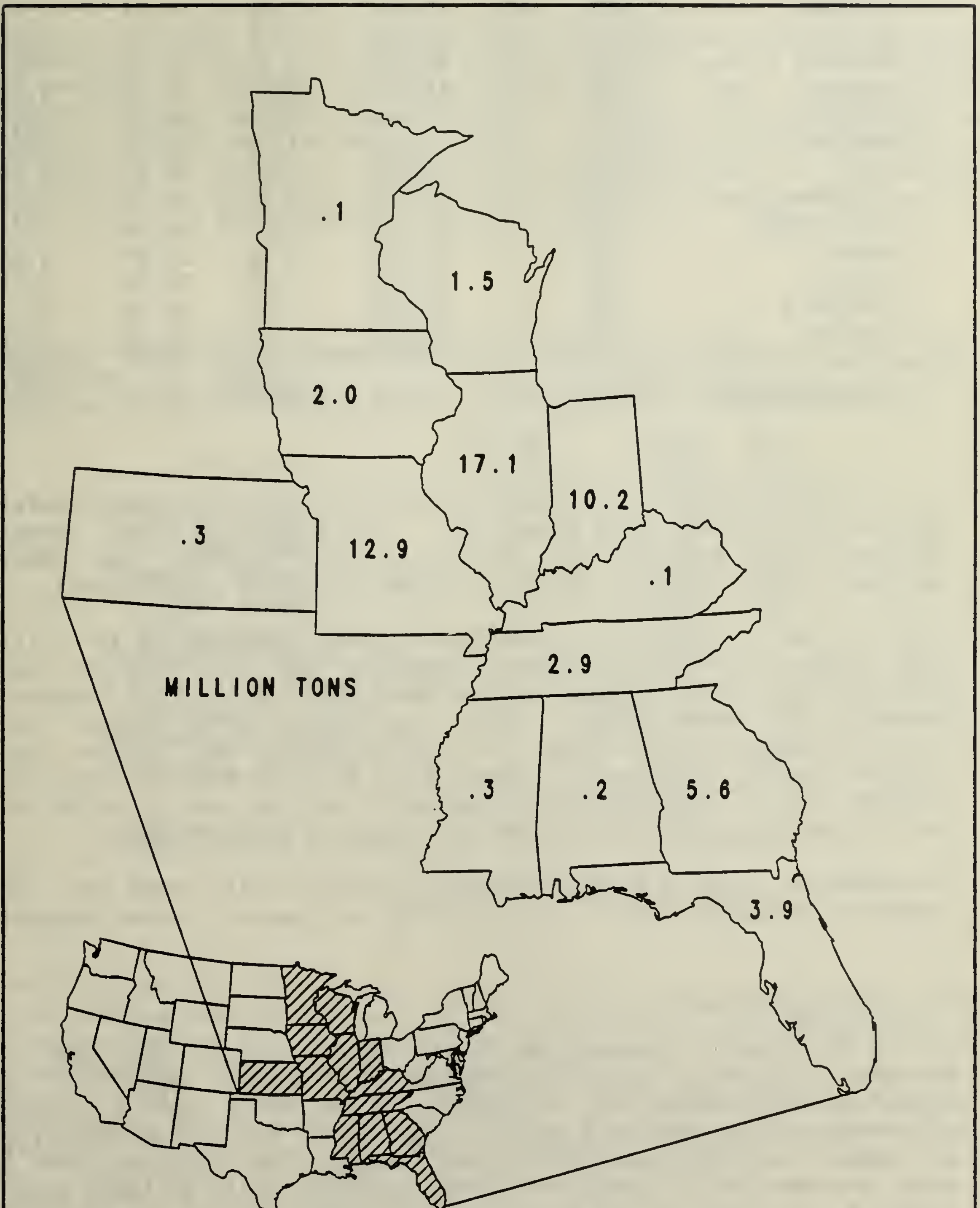

TABLE 1-2. ILLINOIS COAL SALES BY STATE AND QUANTITY AND QUALITY OF COAL.

STATE	TONS (000)	% OF TOTAL	BTU/LB	% SULFUR	$/TON	$/MMBTU
ILLINOIS	17,063	30	10,879	2.89	34.18	1.57
MISSOURI	12,854	23	11,139	2.37	35.46	1.59
INDIANA	10,214	18	10,751	2.68	35.89	1.67
GEORGIA	5,609	10	11,424	2.47	35.89	1.65
FLORIDA	3,935	7	11,616	2.76	49.33	2.12
TENNESSEE	2,915	5	11,749	1.89	28.77	1.23
IOWA	1,971	3	11,257	2.72	35.21	1.56
WISCONSIN	1,491	3	11,587	1.82	40.68	1.76
MISSISSIPPI	336	--	12.199	2.50	42.64	1.75
KANSAS	284	--	11,471	2.48	37.84	1.65
ALABAMA	149	--	12,062	.95	32.80	1.36
MINNESOTA	113	--	12,250	1.62	51.64	2.11
KENTUCKY	65	--	11,949	.90	34.70	1.45
TOTAL/AVERAGE	56,999	100	11,113	2.59	36.19	1.63

The electric utility sales shown in Table 1-2 represent approximately 90 percent of Illinois' coal production. The balance of sales, about six million tons, were to the industrial coal market. The industrial customers are primarily located in Illinois, Indiana and Missouri.

Illinois coal is sold to 62 generating stations operated by 33 utilities. Coal sales to three utilities--Indiana and Michigan Electric Company, Kentucky Utilities Company and Wisconsin Power and Light Company were discontinued after 1985, while new sales were added at two utilities--Kansas City Power and Light Company and Madison Gas and Electric Company. Overall, there was a net increase in sales of two million tons. In-state sales totalled 17 million tons or 30 percent of utility sales, while out-of-state sales were 40 million tons.

In-state coal sales are to 16 generating stations with about ten thousand megawatts of capability.* These stations are owned by seven companies.

---

* In this report, an electric utility generating station's ability to produce electricity is shown as "megawatts of summer capability" rather than "nameplate capacity." Capability as defined by the U.S. Department of Energy is "the maximum load that a generating unit, generating station, or other electrical apparatus can carry under specified conditions for a given period of time without exceeding approved limits of temperature and stress." A major factor in determining capability is the ambient air temperature. Nameplate rating, on the other hand, is the full load continuous rating as determined by the manufacturer.

Out-of-state sales are to 46 generating stations, with a total capability of approximately 37 thousand megawatts. These stations are operated by 26 utilities. The 47 thousand megawatts of electric capability where Illinois coal is utilized represents 16 percent of the nation's coal-fired capability.

Table 1-3 lists the top ten utilities that burn Illinois coal; the number of generating stations that consume Illinois coal; quantity purchased; and the percent of Illinois coal sales to utilities. For example, Union Electric Company received 9.6 million tons, representing 17 percent of Illinois' utility coal sales. In total, these ten utilities purchased more than 44 million tons, or nearly 80 percent of total utility sales. The seven out-of-state utilities listed in Table 1-3 purchased 55 percent of the total, and are identified by an asterisk.

TABLE 1-3. 1986 ILLINOIS COAL PURCHASES BY UTILITY, QUANTITY AND PERCENT OF TOTAL UTILITY PURCHASES.

UTILITY	NO. OF PLANTS	TONS (000)	% OF TOTAL
* UNION ELECTRIC	4	9,616	17
ILLINOIS POWER	4	6,847	12
* PUBLIC SERVICE OF IND.	2	6,444	11
* GEORGIA POWER	3	5,609	10
CENTRAL IL. PUBLIC SERV.	4	3,778	7
* TENNESSEE VALLEY AUTH.	6	3,128	5
* N. INDIANA PUBLIC SERV.	3	2,768	5
COMMONWEALTH EDISON	1	2,732	5
* ASSOCIATED ELEC. COOP	1	2,101	4
* SEMINOLE ELECTRIC COOP	1	1,435	3
TOTAL	29	44,458	79

* Out-of-state utilities.

Table 1-4 lists the Illinois coal sales for the period 1981 through 1986. The table shows the quantity and quality of the coal; delivered price in dollars per ton and dollars per million BTU; and the percent of Illinois coal production. The demand remained fairly stable except for 1981 when there was a major strike between the United Mine Workers of America and the Bituminous Coal Operators Association. The table points out a modest decrease in sulfur content and a minimal increase in BTU content over the years. The delivered prices, except for 1981, have remained nearly constant at $1.60 per million BTU.

TABLE 1-4. ILLINOIS COAL SALES TO ELECTRIC UTILITIES, BY QUANTITY AND QUALITY, DELIVERED PRICE AND PERCENT OF PRODUCTION, 1981-1986.

YEAR	1981	1982	1983	1984	1985	1986
THOUSAND TONS	43,877	51,619	50,557	57,601	54,196	56,999
PERCENT SULFUR	2.70	2.70	2.70	2.70	2.60	2.59
BTU/LB	10,958	10,959	11,000	11,027	11,075	11,113
$/TON	31.98	34.35	35.30	36.05	36.80	36.19
$/MMBTU	1.46	1.57	1.60	1.63	1.66	1.63
% OF PRODUCTION	85	84	87	88	90	90

CYCLONE BOILERS

The type of boiler using Illinois coal is very important in this study. The two types shown seperately in Table 1-5 and Table 1-6 are the cyclone boiler and the pulverized coal boiler. Cyclone boilers use coal with a mesh size of between 1/4 inch and 0, while pulverized coal boilers utilize coal that is of the consistency of talcum powder. The cyclone boiler was designed to utilize low ash fusion coal which is characteristic of Illinois Basin coals. The coal is burned in a cylindrical, refractory lined chamber at a very high temperature. Because of the high temperature, the ash melts and is drained as a liquid and quenched. However, the high temperature produces a nitrogen oxide (NOx) emission rate of 1.4 to 1.8 pounds per million BTU of input, which is considerably higher than pulverized coal boilers. Since 1950, approximately 150 cyclone boilers have been built, with minimal construction after 1975.

In the event that acid rain legislation becomes law, cyclone boilers will have difficulty meeting stricter standards for NOx emissions. This is important to Illinois coal producers, since about 44 percent of in-state capability consists of cyclone boilers and 30 percent of the capability in the Illinois export market is cyclone boilers. NOx control technologies for cyclone boilers are limited and much more expensive than control technologies for pulverized coal boilers.

Table 1-5 provides the megawatts of capability and quantity of Illinois coal purchased for cyclone boilers. The table shows the megawatts of capability and boiler age as of 1995, with and without flue gas desulfurization (FGD), and the associated quantity of Illinois coal. In 1995, it is projected there will be 8,031 megawatts of capability without FGD that will be over 21 years old. This capability consumes about 14 million tons of Illinois coal annually. The table shows the minimal amount of cyclone capability with FGD. Most cyclone units were not required to meet any sulfur dioxide (SO2) emission standards when constructed. However, as SO2 standards become more strict, utilities with cyclone boilers will have to decide whether to use a low sulfur compliance coal or install FGD and burn high sulfur coal. As a general rule, utilities in the past have used a compliance coal rather than install FGD.

TABLE 1-5. CYCLONE BOILER CAPABILITY IN MEGAWATTS AND AGE, AND ILLINOIS COAL SALES.

	AGE OF PLANT AS OF 1995 (IN YEARS)				
	10-15	16-20	21-25	26-30	OVER 30
MW W/OUT FGD:	--	1,011	2,859	3,297	1,875
ILLINOIS COAL SALES (000 TONS):	--	1,403	6,124	6,605	1,387
MW WITH FGD:	--	170	--	--	--
ILLINOIS COAL SALES (000 TONS):	--	461	--	--	--

PULVERIZED COAL BOILERS

Pulverized coal-fired boilers, such as the tangentially-fired boiler, consists of a vertical, rectangular box mounted in each corner of the furnace. These chambers are segmented where the coal and air are mixed in alternate corners to create a swirling motion. This configuration causes more residence time and turbulence for a more thorough burn of the coal. Because of the larger combustion area, temperatures are kept lower and thereby inhibit the production of NOx emissions to approximately 0.7 to 0.9 pound per million BTU of input. Other pulverized coal units (wall-fired) use a number of coal burners in the furnace wall. There are usually four burners in a row, with two, four or six rows. As the units become larger, additional burners can be mounted in the opposite wall (opposed wall-fired). Front wall-fired or opposed-wall fired boilers also emit about 0.7 to 0.9 pound of NOx per million BTU of input.

Table 1-6 contains information for pulverized coal boilers. For example, 14,700 megawatts of capability without FGD will be over 25 years old in 1995. This capability consumes about 12.5 million tons of Illinois coal annually. As with cyclone boilers, the more strict air quality standards have resulted in the switch to a compliance coal rather than installation of FGD at the older stations.

TABLE 1-6. PULVERIZED COAL BOILER CAPABILITY IN MEGAWATTS AND AGE, AND ILLINOIS COAL SALES.

	AGE OF PLANT AS OF 1995 (IN YEARS)				
	10-15	16-20	21-25	26-30	OVER 30
MW W/OUT FGD:	--	8,652	8,039	1,822	12,821
ILLINOIS COAL SALES (000 TONS):	--	13,050	8,147	1,452	11,021
MW WITH FGD:	4,285	1,106	--	--	1,000
ILLINOIS COAL SALES (000 TONS):	5,137	2,139	--	--	83

AGE OF CAPABILITY

Both of the previous tables show the huge amount of capability that will be over 20 years old by 1995. Many acid rain proposals call for a control program by the mid-to late-1990's. Should this be implemented, many plants because of their age, along with the cost of an FGD system may not be retrofitted with FGD and continue to burn high sulfur coal, but will switch to a low sulfur compliance coal.

As stated earlier, Illinois coal is supplied to 62 stations, totalling about 47 thousand megawatts of capability. As of 1995, the capability without FGD totals 40.4 thousand megawatts. Broken down by age, 24 percent of this capability will be 16 to 20 years old; 27 percent will be 21 to 25 years old; 13 percent will be 26 to 30 years old; and 36 percent will be over 30 years old. These 40 thousand megawatts of capability consume approximately 86 percent of Illinois coal sales, annually. This data points out that any change in SO2 and NOx emission standards could have a dramatic impact on the future of the Illinois coal market.

CHAPTER OUTLINE

The following chapters discuss the states where Illinois coal is used. Included in each chapter is a discussion of the fossil-fuel demand; the various types of generation capability; plans for future baseload generating capability; and the quantity and quality of coal used. Following the state perspective is a discussion of the utilities where Illinois coal is burned. The utility section covers the business activity of each utility; coal-fired generation capability and net generation; coal demand; Illinois coal receipts since 1981; and a discussion of the coal-fired generating stations. At the end of each narrative is a table which provides additional data on the generating stations and systemwide operations.

CHAPTER TWO

ALABAMA

Alabama electric utilities purchased approximately 22 million tons of coal; 219 thousand barrels of petroleum; and 0.7 billion cubic feet of natural gas in 1986. For these categories, coal represented three percent of U.S. utility fossil-fuel receipts, while petroleum and natural gas purchases were only negligible. (No national data is available on uranium receipts for nuclear generation.) Alabama utilities purchased about three percent of the nation's total fuel for electric generation. Table 2-1 lists the quantity of each fossil-fuel; the BTU content and percent of total; and the cost per unit; and cost per million BTU. Almost all of the BTU inputs for electrical generation were derived from coal.

TABLE 2-1. ALABAMA FOSSIL-FUEL SOURCES FOR ELECTRIC GENERATION.

FUEL	QUANTITY (000)	BTU (BILLION)	% OF TOTAL	$/UNIT	$/MMBTU
COAL	22,181 tons	534,784	99.7	46.51	1.91
PETROLEUM	219 bls.	1,275	.2	20.27	3.49
NATURAL GAS	687 mmcf.	755	.1	2.69	2.47
TOTAL		536,814	100.0		

Alabama has one investor-owned utility; 36 municipal systems; 23 rural electric cooperatives; one wholesale system; and one federal system. The major suppliers of electricity are Alabama Power Company and the Tennessee Valley Authority.

Alabama electric utilities have 18,818 megawatts of capability. This capability consists of 10,519 megawatts from coal, 4,856 megawatts from nuclear power and 2,940 megawatts from hydro power, with the remainder from natural gas and petroleum. Coal and nuclear represent 82 percent of Alabama's total capability. Alabama's total capability represents three percent of the U.S. total. Of the 44 states that have coal-fired generating capability, Alabama ranks twelfth.

Table 2-2 shows the generating capability by fuel type; number of units; percent of Alabama's total capability; and percent of U.S. total capability. The U.S. total is shown as the percent of Alabama's fuel type to the U.S. total for the same fuel type. For example, the 15,375 megawatts of coal and nuclear capability represent ten percent of the U.S total for these two categories.

TABLE 2-2. ALABAMA SUMMER CAPABILITY.

TYPE OF CAPABILITY	TOTAL	COAL	NUCLEAR	PETROLEUM	NATURAL GAS	WATER
MEGAWATTS	18,818	10,519	4,856	101	400	2,940
NO. OF UNITS	147	41	5	4	8	89
% OF AL TOTAL	100	56	26	--	2	16
% OF U.S. TOTAL	3	4	6	--	--	3

Alabama utilities expect to add two coal units and two nuclear units in the future. The Tennessee Valley Authority will be adding the nuclear units and Alabama Power Company will be adding the coal-fired units. The coal-fired units will require about 3.3 million tons of coal annually. Table 2-3 contains information on these future additions.*

TABLE 2-3. FUTURE BASELOAD CAPABILITY IN ALABAMA.

UTILITY	STATION AND UNIT	CAPABILITY (MW)	FUEL	ON LINE
ALABAMA	Miller 3	653	Coal	1989
POWER	Miller 4	653	Coal	1991
TVA	Bellefonte 1	1,223	Uranium	1994
	Bellefonte 2	1,223	Uranium	1996
TOTAL		3,752		

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* Additions to future generating capacity are as of December 31, 1986. It is important to note that "on-line" dates are the most recent dates reported to the U.S. Department of Energy and are estimated. They can vary from one reporting period to the next. One thousand megawatts of nuclear capability displaces the use of about three million tons of coal annually.

Net generation by Alabama electric utilities totals nearly 69 thousand gigawatthours. (A gigawatthour is equal to one billion kilowatthours.) For Alabama, coal supplies 75 percent of net generation, nuclear 17 percent and water eight percent. Nationally, Alabama accounts for three percent of net generation and ranks 14th among the states in total generation. Table 2-4 provides additional data for each category of generation.

TABLE 2-4. ALABAMA NET GENERATION.

TYPE OF CAPABILITY	TOTAL	COAL	NUCLEAR	PETROLEUM	NATURAL GAS	WATER
GIGAWATTHOURS	68,575	51,693	11,561	34	59	5,527
% OF AL TOTAL	100	75	17	--	--	8
% OF U.S. TOTAL	3	4	3	--	--	2

In 1986, Alabama utilities purchased approximately 22 million tons of coal. Coal receipts were from eight coal producing states, with Illinois supplying less than one percent of the total. The sulfur content ranges from 0.9 percent to 3.9 percent with an overall average of 1.5 percent. The low sulfur coal is provided by coal producers from southern Tennessee, Illinois and West Virginia. The BTU content varies from 11,583 to 12,500 per pound of coal, with a weighted average of 12,175. On a BTU basis, Indiana coal has the lowest delivered price,** while Alabama coal is the most expensive. The Illinois coal averages $1.36 per million BTU. Table 2-5 lists the states or regions supplying coal to Alabama and their respective quantity and quality.

** Delivered price is a function of the mine price, transportation cost and related expenses of transporting the coal from the mine site to the generating station. As a general rule, the greater the distance, the greater the transportation expense and delivered price. Other factors affecting the delivered price are the type of mine (surface or underground), quality of the coal, quantity of coal and spot or contract price, to name a few.

TABLE 2-5. ALABAMA COAL SUPPLIERS.

STATE/REGION	TONS (000)	% OF TOTAL	BTU/LB	% SULFUR	$/TON	$/MMBTU
ALABAMA	15,192	69	12,305	1.29	50.65	2.06
OHIO	2,626	12	11,685	2.34	47.81	2.05
E. KENTUCKY	1,987	9	12,038	1.47	32.23	1.34
W. KENTUCKY	1,264	6	11,708	3.49	26.65	1.14
S. TENNESSEE	672	3	12,434	.85	35.27	1.42
N. TENNESSEE	157	1	12,193	1.55	36.47	1.50
ILLINOIS	149	1	12,062	.95	32.80	1.36
W. VIRGINIA	112	-	12,180	.89	33.94	1.39
VIRGINIA	21	-	12,500	1.09	35.58	1.42
INDIANA	3	-	11,583	3.89	25.03	1.08
TOTAL/AVERAGE	22,183	100	12,175	1.54	46.51	1.91

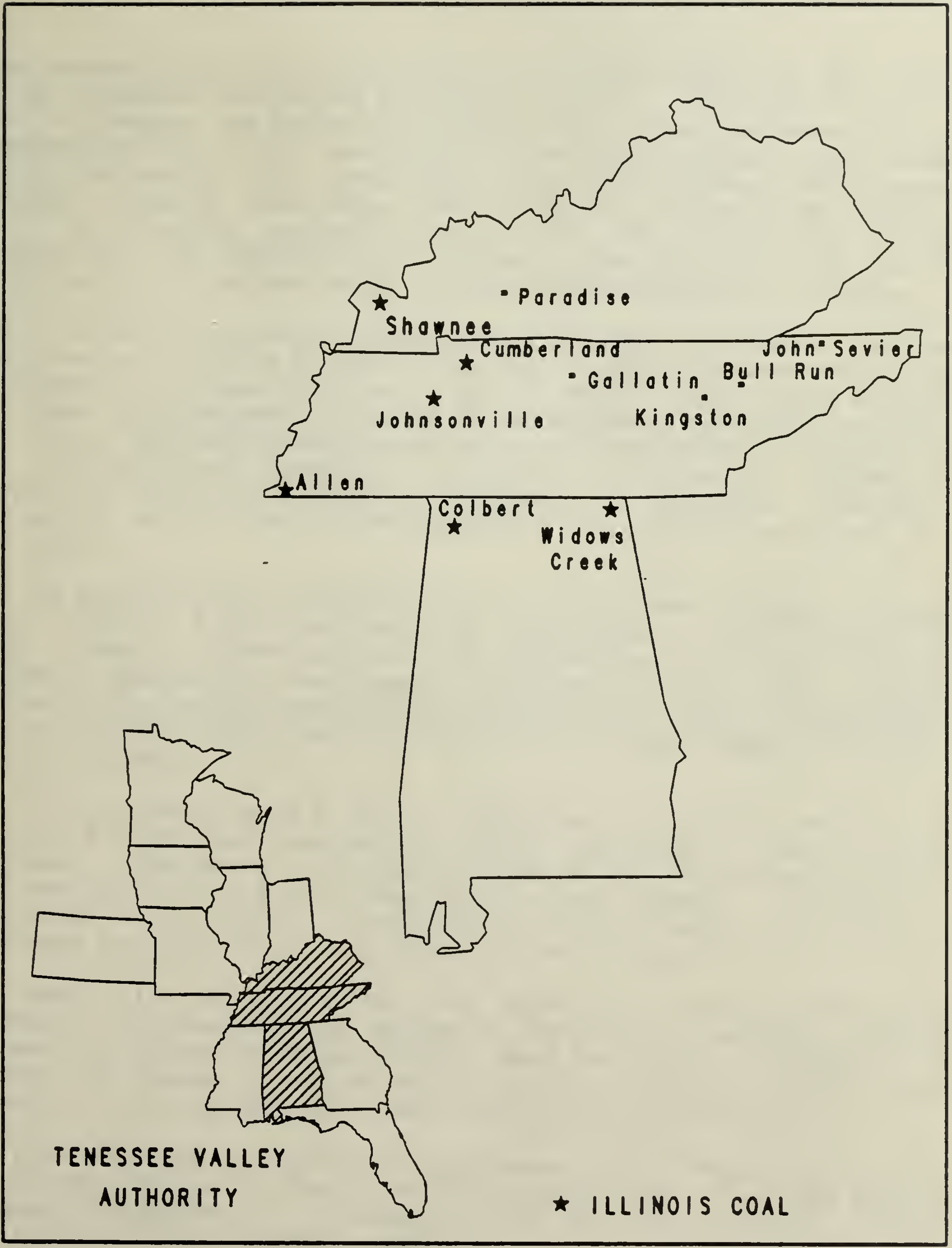
The Tennessee Valley Authority purchased the 149 thousand tons of Illinois coal for its Widows Creek and Colbert stations. This figure represents less than one percent of Alabama's coal purchases and is a reduction of about 0.3 million tons from the previous year. Illinois coal sales, quality of the coal and the delivered price to Alabama electric utilities for the period 1984 through 1986 are shown in Table 2-6. As can be seen in the table, the TVA is purchasing a quality coal at a moderate price. Alabama utilities did not purchase Illinois coal for the period 1981 through 1983.

TABLE 2-6. ALABAMA'S ILLINOIS COAL PURCHASES, QUALITY OF COAL AND DELIVERED PRICE 1984-1986.

YEAR	1984	1985	1986
THOUSAND TONS	74	400	149
PERCENT SULFUR	1.60	.90	.95
BTU/LB	11,885	12,127	12,062
$/TON	34.00	36.52	32.80
$/MMBTU	1.43	1.51	1.36

The following section discusses the Tennessee Valley Authority system and its coal-fired generating capability in Alabama. Map 2-1 shows the location of the Tennessee Valley Authority's coal-fired generating stations throughout the Tennessee Valley.

MAP 2-1
COAL FIRED GENERATING STATIONS



The Tennessee Valley Authority (TVA) is a corporate agency of the United States Government established by Congress in 1933. Its primary function was to develop the Tennessee River Basin and other resources in the Tennessee Valley. It is the largest electric power system in the United States, extending into seven states. The seven states are Alabama, Georgia, Kentucky, Mississippi, North Carolina, Tennessee and Virginia. The TVA provides electrical service to 160 municipalities and cooperatives, 47 industries and ten federal agencies. The TVA employs approximately 33 thousand and is headquartered in Knoxville, Tennessee.

TVA's electrical generation encompasses the states of Alabama, Kentucky and Tennessee. The TVA system is comprised of about 29 thousand megawatts of capability, representing four percent of the U.S. total. Coal accounts for about 16,000 megawatts; nuclear 5,500 megawatts; and 3,500 megawatts of hydro, with the remainder from natural gas and petroleum capability. For the coal-fired capability, 19 percent is located in Alabama, 23 percent is located in Kentucky and 58 percent in Tennessee. Currently, the nuclear units are out of service and will be back on-line in the next few years.

The TVA has electrical connections with: Georgia Power Company; Alabama Power Company; Mississippi Power and Light Company; Arkansas Power and Light Company; Eastern Kentucky Power Cooperative; Kentucky Utilities Company; Appalachian Power Company; Carolina Power and Light Company; Louisville Gas and Electric Company; Big River Rural Electric Cooperative; Central Illinois Public Service Company; Illinois Power Company; and Union Electric Company.

TVA's total generation is 91 billion kilowatthours, with coal producing 83 billion kilowatthours and hydro generation accounting for most of the remainder. The TVA is the largest consumer of coal in the United States, with receipts of 36.6 million tons for its eleven stations. The coal is valued at $1.2 billion. To keep its coal costs competitive, the TVA purchases the coal from a large number of coal producers.

In Alabama, the TVA has two coal-fired stations with capability of 3,038 megawatts, representing ten percent of TVA's total capability and 19 percent of its coal-fired capability. These two stations represent 16 percent of Alabama's total capability and 29 percent of Alabama's coal capability. The stations use a small quantity of Illinois coal.

Table 2-7 lists TVA's Illinois coal purchases and delivered prices at the two Alabama stations for the period 1984 through 1986. The table shows a reduced consumption of Illinois coal from 1985 due primarily to the availability of less expensive coal.

TABLE 2-7. TVA'S ILLINOIS COAL PURCHASES, QUALITY OF COAL AND DELIVERED PRICES IN ALABAMA 1984-1986.

YEAR	1984	1985	1986
THOUSAND TONS	74	400	149
PERCENT SULFUR	1.60	.90	.95
BTU/LB	11,885	12,127	12,062
$/TON	34.00	36.52	32.80
$/MMBTU	1.43	1.51	1.36

TVA's Alabama coal-fired stations have net generation of 13.3 billion kilowatthours, representing 14 percent of the TVA's total generation and 19 percent of Alabama's net generation. The following paragraphs discuss the two stations.

The Colbert Station is located in northwestern Alabama at Pride. The station has five older pulverized coal units with capability of 1,276 megawatts. This capability accounts for 42 percent of TVA's Alabama capability and eight percent of TVA's systemwide coal-fired capability. The station's 7.6 billion kilowatthours of net generation represents 68 percent of its capability. The average cost per net kilowatthour of generation is two cents, ranking tenth in efficiency.* Included in this average cost is the fuel expense which accounts for 88 percent of the total.

The station purchased 3.5 million tons of coal and burned 3.3 million tons in 1986. The coal averages 2.3 percent sulfur and 11,632 BTU. The SO2 emission rate, which is a function of sulfur and BTU content, is 3.8 pounds per million BTU of heat input. Based on 1983 nationwide data, Colbert ranks 33rd in total tons of SO2 emissions. Unit 5 is rated as easy to retrofit with FGD, while Units 1 through 4 are rated very difficult to retrofit ** because of age, cost and space limitations.

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* Efficiency is measured by the total power production expense. Included in this cost are the operation expense, maintenance expense and fuel expense. This cost is shown as "cents per kilowatthour of net generation." As a general rule, the lower the power production expense, the more often the station is used because of its economic efficiency. On average, 80 percent of the total power production expense is the fuel cost. This expense is shown in Table 2-8 under "COST CENTS/KWH."

The major coal supplier is R and F Coal Company from Ohio with 74 percent of the total. Addington Brothers Mining, Incorporated of Kentucky supplies most of the remainder. Only a small quantity of Illinois coal is used at the station. The Illinois coal supplier is Old Ben Coal Company by spot market, with delivery by rail and barge.

The Widows Creek Station is located in northeastern Alabama near Stevenson. The station has eight pulverized coal units with a total capability of 1,762 megawatts. The capability represents 58 percent of TVA's Alabama capability and 11 percent of TVA's total capability. The station's 5.7 billion kilowatthours of net generation represents 37 percent of the station's capability. The average cost per kilowatthour is 2.1 cents, with fuel at 1.6 cents. Widows Creek is the least efficient coal-fired station operated by TVA, ranking eleventh.

Widows Creek purchased 2.7 million tons of coal and consumed 2.5 million tons in 1986. The coal averages 12,161 BTU and 2.1 percent sulfur. The SO2 emission rate is about 1.8 pounds per million BTU. Nationally, the station ranks 75th in total SO2 emissions.

** The rank in tons of SO2 emissions and the consideration of FGD retrofit were taken from Evaluation of SO2 Emissions And The FGD Retrofit Feasibility At The 200 Top Emitting Generating Stations prepared by Energy Ventures Analysis, Incorporated for the U.S. Environmental Protection Agency. Data includes the ranking of the 200 largest SO2 emitting facilities, and the cost and engineering considerations for FGD retrofit. SO2 emissions were based on 1983 data. FGD retrofit categories are: easy; modest; difficult; and very difficult. The "easy" rank means that the capital cost is from 1.0 to 1.3 times more expensive than an FGD system at a new 500 megawatt plant; "modest" costs from 1.3 to 1.6 times more; "difficult" costs from 1.6 to 1.9; and "very difficult" is greater than 1.9 times the capital cost of a new FGD system. Ranking of the facilities for FGD retrofit was determined by the size of the boiler; site congestion; stack adjustments; boiler modifications; demolition; duct length requirements; gas flow adjustments; soil conditions and underground modifications. The study points out, "that it should be useful in determining the relative degree of difficulty of retrofitting FGD systems on these powerplants." Other options available to the utility industry are life extension projects to up-grade a coal-fired station and a number of clean coal technology options to meet air quality standards. These options are not discussed in this study.

Sixteen Kentucky coal producers supply 74 percent of Widows Creek's coal needs. The Illinois coal is supplied by Consolidation Coal Company by spot market, and represents about five percent of the station's total coal demand. The Illinois coal is transported by rail and barge.

Widows Creek's Units 7 and 8 are retrofitted with limestone FGD systems. The Unit 7 scrubber was brought on-line in 1981 and the Unit 8 scrubber started in 1977. Both FGD systems are rated at 80 percent SO2 removal. The capital cost for Unit 8 was $158 per kilowatt, with an operation and maintenance expense of seven mills per kilowatthour. (A mill is equal to one tenth of a cent). No figures are available for the Unit 7 system.

Table 2-8 details the two TVA coal-fired generating stations in Alabama. The table includes information on the performance for 1986. Included in the table are data on the generating station and information on the coal suppliers, quantity and quality of coal, delivered prices and SO2 emissions. This table format will be used throughout the study.

TABLE 2-8
TENNESSEE VALLEY AUTHORITY-ALABAMA
COAL-FIRED GENERATING STATIONS AND STATISTICS
1986

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TON)
COLBERT	1	1954	194.0	PC	COAL						
	2	1955	194.0	PC	COAL						
	3	1955	194.0	PC	COAL						
	4	1955	194.0	PC	COAL						
	5	1965	500.0	PC	COAL						
TOTAL			1,276.0			7,605,443	68	231	2.04	9,930	3,254,000

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
ILLINOIS	3.0	11,500	2.30	8.30	27.65	1.202	3.900
KENTUCKY	920.2	11,480	2.01	11.28	28.27	1.231	3.414
OHIO	2,619.4	11,685	2.34	11.60	47.81	2.046	3.905
TOTAL	3,542.6	11,632	2.25	11.52	42.72	1.836	3.772

1. Unit Type describes the boiler type, where PC means pulverized coal and CY means cyclone.
2. Net Generation includes the kilowatthours of generation, minus what was used at the station.
3. Capability Factor, shown as a percent, is derived by dividing net generation by (megawatts of summer capability * 8,760 hours).
4. $/KW refers to the capital cost per kilowatt of installed capacity. Capital cost/capacity.
5. Cost of generation, shown as cents per kilowatthour, includes the power production and fuel expenses.
6. BTU per Kilowatthour is determined by the amount of heat input necessary to generate a kilowatthour of electricity. On average, a station uses about 10,000 BTU of heat input per kilowatthour.

TABLE 2-8 (CONTINUED)

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA- BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TON)
WIDOWS	1	1952	127.0	PC	COAL						
CREEK	2	1952	127.0	PC	COAL						
	3	1952	127.0	PC	COAL						
	4	1952	127.0	PC	COAL						
	5	1954	127.0	PC	COAL						
	6	1954	127.0	PC	COAL						
	* 7	1960	500.0	PC	COAL						
	* 8	1964	500.0	PC	COAL						
TOTAL			1,762.0			5,657,453	37	216	2.09	10,890	2,547,000

* Units 7 and 8 are equipped with FGD.

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	FGD REMOVAL (%)	SO2 LB/MMBTU
ALABAMA	17.0	12,200	0.86	12.18	28.41	1.164		1.375
ILLINOIS	145.7	12,073	0.92	5.51	32.91	1.363		1.486
INDIANA	3.2	11,583	3.89	6.92	25.03	1.080		6.549
KENTUCKY	1,981.3	12,105	2.52	10.68	29.49	1.218		4.059
OHIO	6.2	11,587	2.40	11.90	47.41	2.046		4.039
TENNESSEE	509.2	12,400	1.00	7.73	34.92	1.408		1.573
VIRGINIA	13.4	12,565	0.90	7.40	34.00	1.353		1.397
TOTAL	2,676.0	12,161	2.10	10.61	30.76	1.265	80	1.839

CHAPTER THREE

FLORIDA

Florida electric utilities purchased approximately 18 million tons of coal; 44 million barrels of petroleum; and 142 billion cubic feet of natural gas in 1986. For these categories, coal represented three percent of U.S. utility coal purchases, while petroleum and natural gas were 19 percent and six percent, respectively. On a BTU basis, Florida purchased five percent of the U.S. fossil-fuel total. Table 3-1 details each of these fossil-fuels to include quantity, BTU content and cost.

TABLE 3-1. FLORIDA FOSSIL-FUEL SOURCES FOR ELECTRIC GENERATION.

FUEL	QUANTITY (000)	BTU (BILLION)	% OF TOTAL	$/UNIT	$/MMBTU
COAL	18,311 tons	449,570	51.4	47.36	1.93
PETROLEUM	44,415 bls.	281,499	32.2	13.74	2.17
NATURAL GAS	142,424 mmcf.	143,582	16.4	2.10	2.08
TOTAL		874,651	100.0		

Florida has six investor-owned utilities, 33 municipal systems, 16 rural electric cooperatives and one state system. The major suppliers of electricity are Florida Power and Light Company, Florida Power Corporation, Gulf Power Company, Tampa Electric Company and Seminole Electric Cooperative. These five utilities account for most of Florida's electrical generation.

Florida's electric utilities have 31,353 megawatts of capability. This capability consists of 11,472 megawatts of petroleum; 8,768 megawatts of coal; 6,901 megawatts of natural gas; 3,798 megawatts of nuclear; 45 megawatts of water; and 369 megawatts of other. "Other" is defined as electricity from biomass, fuel cells, geothermal, solar, waste, wind and wood. Florida's total capability represents five percent of the nation's total. Florida ranks 14th among the states in coal-fired capability.

Table 3-2 provides a breakdown of the various fuel types by capability, number of units, percent of Florida's total capability and percent of U.S. total capability. The U.S. total is shown as the percent of Florida's fuel type to the U.S. total for the same fuel type. As shown in the table, 59 percent of Florida's capability is from petroleum and natural gas. This large percentage of capability is a result of the capital cost for these types of generation and the cost of fuel, in comparison to coal-fired capability.

TABLE 3-2. FLORIDA SUMMER CAPABILITY.

TYPE OF CAPABILITY	TOTAL	COAL	NUCLEAR	PETROLEUM	NATURAL GAS	WATER	OTHER
MEGAWATTS	31,353	8,768	3,798	11,472	6,901	45	369
NO. OF UNITS	371	27	5	206	120	7	6
% OF FL TOTAL	100	28	12	37	22	--	1
% OF U.S. TOTAL	5	3	4	15	6	--	9

Florida utilities will add two coal-fired stations in the future. One station is jointly owned by the Jacksonville Electric Authority and Florida Power and Light Company, while the second station is jointly owned by the Orlando Utilities Commission, Florida Municipal Power Agency and Kissimmee Utility Authority. These stations will consume approximately 2.6 million tons of coal annually. Table 3-3 details these generating stations.

TABLE 3-3. FUTURE BASELOAD CAPABILITY IN FLORIDA.

UTILITY	STATION AND UNIT	CAPABILITY (MW)	FUEL	ON LINE
JACKSONVILLE ELECTRIC AUTH.	St Johns River 2	629	Coal	1988
ORLANDO UTIL. COMMISSION	Stanton Energy 1	396	Coal	1987
TOTAL		1,025		

Net generation by Florida electric utilities totals 108 thousand gigawatthours, an increase of 13 percent over 1985. Petroleum, coal and natural gas supplies about 80 percent of the total, with the balance from nuclear. On a national basis, Florida accounts for four percent of generation and ranks sixth in total generation. Table 3-4 is a breakdown of Florida's generation by fuel source.

TABLE 3-4. FLORIDA NET GENERATION.

TYPE OF CAPABILITY	TOTAL	COAL	NUCLEAR	PETROLEUM	NATURAL GAS	WATER
GIGAWATTHOURS	108,465	42,632	22,036	27,416	16,168	212
% OF FL TOTAL	100	39	20	25	15	--
% OF U.S. TOTAL	4	3	5	20	7	--

Florida utilities purchased approximately 18 million tons of coal in 1986. This coal is supplied by seven states and three foreign countries. The foreign coal is supplied by South Africa, Canada and Columbia. The sulfur content varies from 0.5 percent to 2.9 percent with a weighted average of 1.8 percent. The BTU content ranges from 10,005 to 12,859 per pound of coal, with an average of 12,276. On a BTU cost basis, Indiana coal has the lowest delivered price, while Virginia coal is the most expensive. Based on sulfur and BTU content, the Columbian coal is a better quality coal and $.52 per million BTU cheaper than Illinois coal, while the South African coal is of high quality and about the same price as Illinois coal.

TABLE 3-5. FLORIDA COAL SUPPLIERS.

STATE/REGION	TONS (000)	% OF TOTAL	BTU/LB	% SULFUR	$/TON	$/MMBTU
E. KENTUCKY	6,102	33	12,798	.95	49.29	1.93
W. KENTUCKY	4,798	26	12,125	2.90	42.16	1.74
ILLINOIS	3,935	21	11,616	2.76	49.33	2.12
S. AFRICA	1,031	6	11,755	.53	50.98	2.17
W. VIRGINIA	836	5	12,670	.91	42.80	1.73
VIRGINIA	810	4	12,629	.71	60.60	2.40
COLUMBIA	418	2	12,257	.50	39.21	1.60
OKLAHOMA	249	1	12,859	.58	49.09	1.91
ALABAMA	79	--	12,277	2.06	35.29	1.44
CANADA	37	--	10,005	.63	26.70	1.33
INDIANA	16	--	11,087	2.36	20.51	.93
TOTAL/AVERAGE	18,311	100	12,276	1.80	47.36	1.93

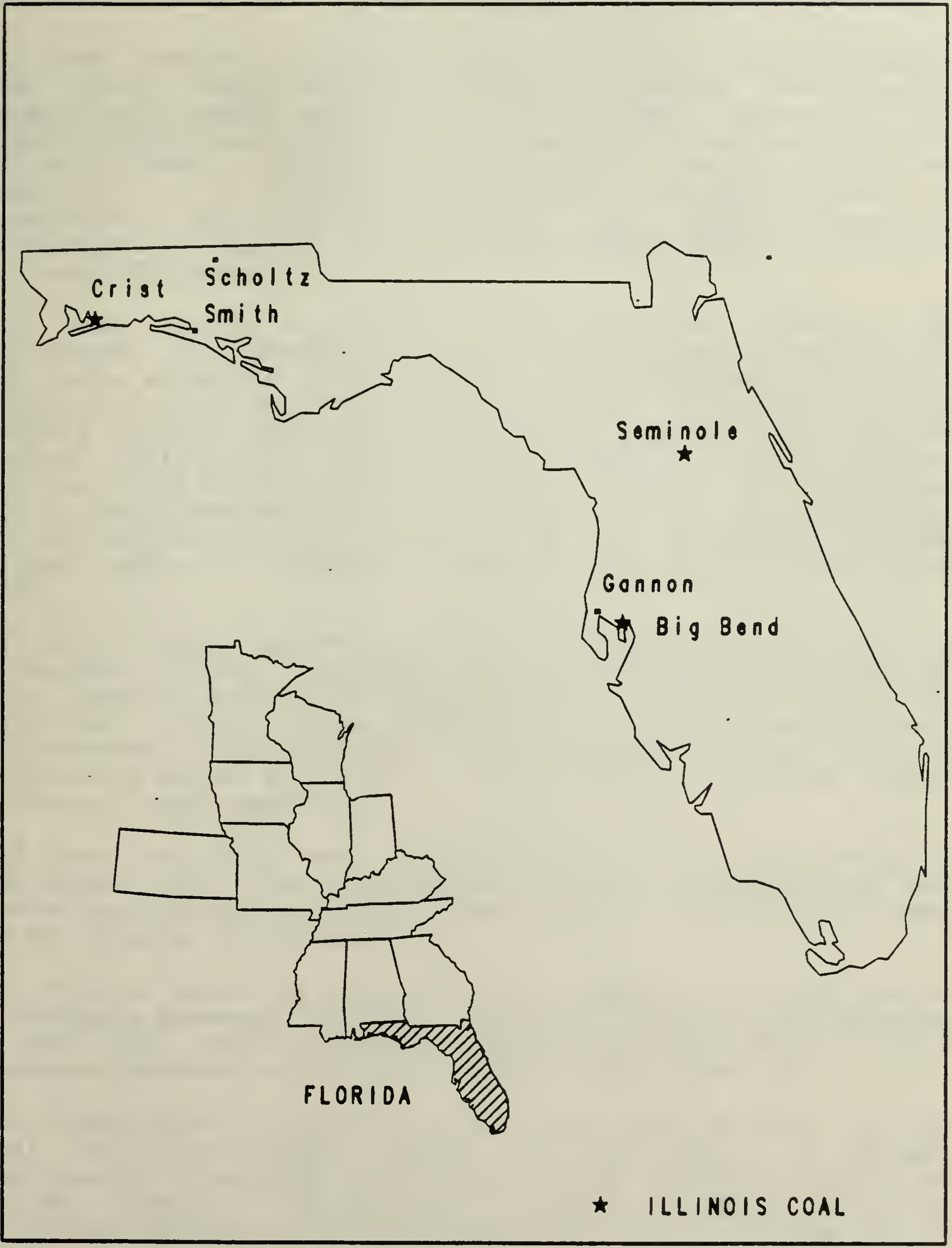
Illinois coal suppliers sold about four million tons of coal to three Florida utilities, representing 21 percent of Florida's total utility coal purchases. This coal is sold to Tampa Electric Company, Gulf Power Company and Seminole Electric Cooperative. Since 1981, Florida utilities have increased their use of Illinois coal by 240 percent. Illinois coal sales and delivered prices to Florida, for the period 1981 through 1986 are shown in Table 3-6.

TABLE 3-6. FLORIDA'S ILLINOIS COAL PURCHASES, QUALITY OF COAL AND DELIVERED PRICES 1981-1986.

YEAR	1981	1982	1983	1984	1985	1986
THOUSAND TONS	1,647	1,280	1,411	2,080	3,741	3,935
PERCENT SULFUR	2.50	2.60	2.40	2.80	2.80	2.76
BTU/LB	11,836	11,875	11,993	11,743	11,518	11,616
$/TON	48.52	50.68	53.45	49.17	49.60	49.33
$/MMBTU	1.56	2.13	2.23	2.09	2.15	2.12

A discussion of the three utilities that use Illinois coal follows. Map 3-1 shows the locations of the coal-fired generating stations operated by these utilities.

MAP 3-1
COAL FIRED GENERATING STATIONS



GULF POWER COMPANY

Gulf Power Company is an operating subsidiary of The Southern Company. Other electric subsidiaries of Southern include Alabama Power Company, Georgia Power Company and Mississippi Power Company. Southern is the largest investor-owned utility in the United States, serving about ten million customers. Southern's service territory covers 120 thousand square miles in the southeastern United States. Its electric sales are approximately 123 billion kilowatthours. Gulf Power Company is headquartered in Pensacola, Florida and The Southern Company is located in Wilmington, Delaware.

Gulf Power Company is involved in the generation, purchase and distribution of electricity to 71 communities in northwestern Florida. Gulf also wholesales electricity to a non-affiliated utility, a municipality and two rural electric cooperatives. The company's service territory covers 7,400 square miles with a population of about 675 thousand. Gulf provides service to approximately 264 thousand customers. It is the fourth largest utility in Florida, with sales of approximately eight billion kilowatthours and revenue of $.5 billion. The economic base of the service territory consists of industry, agriculture, tourism, national defense and commercial fishing. Gulf employs approximately 1,500.

Gulf Power Company has three coal-fired generating stations located in northwestern Florida. The company also owns 50 percent of Mississippi Power Company's Daniel coal-fired station (510 megawatts), located in Mississippi. Gulf's Florida capability totals 1,577 megawatts, with 1,558 megawatts of coal capability. Gulf's Florida coal-fired capability represents 18 percent of Florida's coal-fired capability and five percent of Florida's total capability.

Gulf Power has 6,232 miles of above ground lines and 417 miles of underground lines. The company has electrical interconnections with Florida Power Corporation, Alabama Power Company, Georgia Power Company and the Tennessee Valley Authority.

Gulf Power has generation of 8.5 billion kilowatthours, with 6.6 billion kilowatthours generated in Florida. Ninety-nine percent of the generation is from coal, with the remainder from gas and oil. Gulf's Florida generation represents six percent of Florida's total generation.

Gulf Power Company purchased 3.1 million tons of coal in 1986. Of this total, one Illinois producer supplies 1.3 million tons, or 42 percent. This figure also represents 33 percent of Florida utilities' Illinois coal receipts. Table 3-7 lists Gulf Power's Illinois coal purchases, quality of coal and delivered prices for the past four years. As shown in the table, coal sales have averaged about 1.3 million tons per year and $54.00 per ton.

TABLE 3-7. **GULF POWER'S ILLINOIS COAL PURCHASES, QUALITY OF COAL AND DELIVERED PRICES 1983-1986.**

YEAR	1983	1984	1985	1986
THOUSAND TONS	1,085	1,249	1,355	1,282
PERCENT SULFUR	2.65	2.86	2.79	2.82
BTU/LB	11,850	11,983	12,029	12,028
$/TON	52.10	54.46	54.48	53.63
$/MMBTU	2.20	2.27	2.27	2.23

The following section discusses Gulf's three coal-fired stations located in Florida. See Map 3-1, in the Florida section, for the locations of these stations. For information on the Daniel Station, see Mississippi Power Company in Chapter Eleven.

The Crist Station is located in the southwest portion of Florida's panhandle at Pensacola. The station has four pulverized coal units with capability of 1,016 megawatts. This represents 49 percent of Gulf's total capability. Crist's generation of 3.5 billion kilowatthours is 39 percent of its capability and 41 percent of Gulf's total generation. The production expense averages three cents per kilowatthour, with fuel at 2.3 cents. Based on the production expense, Crist is Gulf's least efficient station.

Crist purchased 1.7 million tons of coal and consumed 1.6 million tons in 1986. The coal averages 12,083 BTU per pound of coal and 2.8 percent sulfur. Its SO2 emission rate is 4.6 pounds per million BTU of input. Based on tons of SO2, Crist is ranked 65th, nationally. Units 4 and 5 are rated as very difficult to retrofit with FGD because of age, size and space limitations, while Units 6 and 7 are rated as modest because of age, size and availability of space.

Peabody Coal Company supplies the 1.3 million tons of Illinois coal, representing 76 percent of the station's coal receipts. Peabody's contract is scheduled to terminate in 2007. The coal is delivered by barge. A majority of the Kentucky coal is supplied by Pyro Mining Company by contract.

The Scholz Station is located in northwestern Florida near Chattahoochee. The station consists of two relatively old pulverized coal units with capability of 93 megawatts, representing four percent of Gulf's total capability. Scholz's generation of 0.7 billion kilowatthours represents

84 percent of its capability and accounts for eight percent of Gulf's Florida generation. Scholz is the most efficient of the three stations. The production expense averages 2.4 cents per kilowatthour, with fuel at two cents.

The station purchased and consumed about 0.3 million tons of coal in 1986. The coal averages 12,409 BTU per pound of coal and 3.0 percent sulfur. SO2 emissions are 4.6 pounds per million BTU of input. Scholz is not ranked in the top 200 SO2 emitting stations and because of age and size is unlikely to be retrofitted with FGD. Pyro Mining Company of Kentucky supplies most of its coal needs.

The Smith Station is located in the southern portion of the Florida panhandle at Panama City. It consists of two older pulverized coal units with capability of 356 megawatts, or 17 percent of Gulf's total capability. The station's generation is 2.3 billion kilowatthours, which accounts for 74 percent of its capability and 27 percent of Gulf's total generation. It is the company's second most efficient plant. The average production expense per kilowatthour is 2.5 cents, with fuel at 2.3 cents.

Smith purchased and used one million tons of coal in 1986. The coal averages 11,764 BTU per pound of coal and 0.6 percent sulfur. The SO2 emission rate is about one pound per million BTU of input. Nearly all of the coal used by the Smith station is imported from South Africa through Hansen Coal Corporation, while the Kentucky coal is supplied by Pyro Mining Company.

Table 3-8 furnishes additional information on these stations. As shown in the table, about 99 percent of Gulf's capability and generation are the result of coal. Data on Gulf's share of the Daniel's station is also included in systemwide statistics at the end of the table.

TABLE 3-8
GULF POWER COMPANY
COAL-FIRED GENERATING STATIONS AND STATISTICS
1986

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
CRIST	4	1959	87.5	PC	COAL						
	5	1961	89.0	PC	COAL						
	6	1970	332.0	PC	COAL						
	7	1973	507.9	PC	COAL						
TOTAL			1,016.4			3,516,582	39	222	2.99	10,822	1,558,000

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
ALABAMA	25.0	12,584	2.76	10.03	30.48	1.211	4.277
ILLINOIS	1,282.0	12,028	2.82	9.50	53.63	2.229	4.572
KENTUCKY	389.0	12,228	2.89	8.95	31.68	1.295	4.609
TOTAL	1,696.0	12,083	2.84	9.38	48.25	1.997	4.583

TABLE 3-8 (CONTINUED)

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
SCHOLZ	1	1953	46.0	PC	COAL						
	2	1953	47.1	PC	COAL						
TOTAL			93.1			687,618	84	255	2.39	11,765	331,000

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
ALABAMA	26.4	12,184	2.81	11.80	32.38	1.329	4.497
KENTUCKY	325.7	12,427	2.96	9.74	40.39	1.625	4.645
TOTAL	352.1	12,409	2.95	9.90	39.79	1.603	4.636

TABLE 3-8 (CONTINUED)

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
SMITH	1	1965	165.1	PC	COAL						
	2	1967	190.6	PC	COAL						
TOTAL			355.7			2,292,026	74	221	2.54	10,225	978,000

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
KENTUCKY	13.4	12,476	3.18	10.22	45.53	1.825	4.970
IMPORTED	1,030.5	11,755	0.53	12.45	50.98	2.169	0.879
TOTAL	1,043.9	11,764	0.57	12.42	50.91	2.164	0.945

TOTAL CAPABILITY: 2,087 MEGAWATTS
COAL-FIRED CAPABILITY: 1,975 MEGAWATTS
TOTAL COAL PURCHASES: 3,092,400 TONS
ILLINOIS COAL PURCHASES: 1,282,400 TONS
TOTAL GENERATION: 8.5 BILLION KILOWATTHOURS
COAL-FIRED GENERATION: 8.4 BILLION KILOWATTHOURS

SEMINOLE ELECTRIC COOPERATIVE, INCORPORATED

Seminole Electric Cooperative is a rural electric cooperative involved in the generation, purchase and wholesale of electricity in central Florida. The Co-op's customers consist of 11 district cooperatives. Seminole's home office is located in Tampa, Florida.

Electric sales are about seven billion kilowatthours, with a value of nearly $350 million. Of these sales, almost all of the total are produced by Seminole, while the balance is purchased from various investor-owned and municipally-owned utilities. This ranks Seminole fifth in statewide utility sales.

Seminole has one coal-fired generating station and owns about two percent of Florida Power Corporation's Crystal River nuclear station. The coal-fired station has a capability of 1,210 megawatts, while the nuclear portion is about 13 megawatts. The coal-fired capability represents 15 percent of Florida's coal-fired capability. Seminole has yearly generation of approximately seven billion kilowatthours. Statewide, this figure accounts for six percent of total generation.

Seminole purchased about three million tons of coal in 1986. Of this total, one Illinois coal producer supplies 1.4 million tons, or 47 percent of the total, and represents 35 percent of Florida's Illinois coal purchases. Since 1984, Seminole has increased its Illinois coal receipts by about 400 percent, while the delivered price has fallen by $.08 per million BTU. Table 3-9 shows the Illinois coal purchases, quality of coal and delivered prices to Seminole since 1984.

TABLE 3-9. SEMINOLE'S ILLINOIS COAL PURCHASES, QUALITY OF COAL AND DELIVERED PRICES 1984-1986.

YEAR	1984	1985	1986
THOUSAND TONS	339	692	1,435
PERCENT SULFUR	2.81	2.61	2.51
BTU/LB	11,449	11,704	11,669
$/TON	51.78	56.52	50.87
$/MMBTU	2.26	2.42	2.18

The Seminole Station is located in northeastern Florida at Palatka. The station consists of two new pulverized coal units with capability of 1,210 megawatts. Units 1 and 2 are each rated at 605 megawatts. Seminole's generation of 6.8 billion kilowatthours represents 64 percent of the station's capability and accounts for 99 percent of the Co-op's total generation. The production expense per kilowatthour of generation is not available, but the fuel expense is 2.1 cents per kilowatthour.

Almost three million tons of coal is purchased and used each year. The coal averages 12,076 BTU per pound of coal and 2.7 percent sulfur. White County Coal Corporation supplies the Illinois coal under long-term contract through 2010. The Illinois coal is received by barge. Webster County Coal Corporation is the major Kentucky coal supplier for most of the remainder. Webster's contract runs through 2010.

Both of Seminole's units utilize a limestone FGD system rated at 1,210 megawatts. The capital cost and operation and maintenance expenses are not available. The FGD system has a removal rate of 86 percent. The SO2 emission rate for the station is about 0.6 pound per million BTU of input. Table 3-10 provides additional information on the Seminole Station, as well as, data on the Seminole system. Refer to Map 3-1 for the location of the Seminole Station.

TABLE 3-10
SEMINOLE ELECTRIC COOPERATIVE
COAL-FIRED GENERATING STATION AND STATISTICS
1986

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
SEMINOLE	* 1	1983	605.0	PC	COAL						
	* 2	1984	605.0	PC	COAL						
TOTAL			1,210.0			6,831,077	64	N.A.	N.A.	10,274	2,906,000

* Units 1 and 2 are equipped with FGD.

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	FGD REMOVAL (%)	SO2 LB/MMBTU
ILLINOIS	1,435.0	11,669	2.51	8.11	50.87	2.180		4.194
KENTUCKY	1,517.0	12,461	3.00	9.19	48.42	1.943		4.695
TOTAL	2,952.0	12,076	2.74	8.66	49.61	2.054	86	0.619

TOTAL CAPABILITY:	1,223 MEGAWATTS
COAL-FIRED CAPABILITY:	1,210 MEGAWATTS
TOTAL COAL PURCHASES:	2,952,000 TONS
ILLINOIS COAL PURCHASES:	1,435,000 TONS
TOTAL GENERATION:	6.9 BILLION KILOWATTHOURS
COAL-FIRED GENERATION:	6.8 BILLION KILOWATTHOURS

TAMPA ELECTRIC COMPANY

Tampa Electric Company is a public utility engaged in the generation, transmission and sale of electricity on the west coast of Florida. The service territory covers approximately 1,900 square miles and includes the cities of Tampa, Winter Haven, Plant City and Dade City, with a total population of more than 850 thousand. The company supplies electricity to about 400 thousand customers. Tampa Electric Company is an operating subsidiary of TECO Energy, Incorporated, a holding company. Both employ approximately 3,400. Tampa Electric Company and TECO Energy, Incorporated are headquartered in Tampa, Florida.

Electric sales of approximately 13 billion kilowatthours are valued at $.9 billion. Based on total kilowatthours sold, Tampa Electric ranks as the third largest Florida electric utility and 54th largest investor-owned utility, nationally.

The company has two coal-fired generating stations and one oil-fired station. The two coal-fired stations have 2,663 megawatts of capability and represent 30 percent of Florida's coal-fired capability and eight percent of Florida's total capability.

Tampa Electric has 1,137 miles of above ground lines and 1,578 miles of underground lines. Tampa has electrical interconnections with Florida Power Corporation, Florida Power and Light Company and the City of Lakeland.

The company has generation of about 13 billion kilowatthours. Almost all of this total (99%) is from coal-fired generation with the balance from the oil-fired station. This generation represents 12 percent of Florida's total generation.

Tampa Electric purchased 5.6 million tons of coal in 1986. Illinois coal producers supply 1.2 million tons, or 21 percent of Tampa's coal demand. Overall, the Illinois coal represents seven percent of Florida's total coal purchases. Since 1985, Tampa Electric has reduced its Illinois coal receipts by 28 percent. Table 3-11 shows Tampa Electric's Illinois coal purchases, quality of coal and delivered prices since 1983.

TABLE 3-11. TAMPA ELECTRIC COMPANY'S ILLINOIS COAL PURCHASES, QUALITY OF COAL AND DELIVERED PRICES 1983-1986.

YEAR	1983	1984	1985	1986
THOUSAND TONS	22	460	1,694	1,217
PERCENT SULFUR	3.00	2.94	2.97	2.98
BTU/LB	11,705	11,276	11,034	11,118
$/TON	31.00	31.98	42.87	42.97
$/MMBTU	1.32	1.42	1.94	1.93

The Big Bend Station is located in west central Florida at Tampa. The station consists of four pulverized coal units with capability of 1,559 megawatts. This capability represents 52 percent of Tampa's total capability. Big Bend's generation of 8.2 billion kilowatthours represents 60 percent of its capability and 61 percent of Tampa's total generation. The production expense averages 2.6 cents per kilowatthour, with fuel at 2.2 cents. Big Bend is Tampa's most efficient station.

The company purchased 5.2 million tons of coal and used 3.6 million tons of coal in 1986. The coal averages 12,032 BTU per pound of coal and 2.3 percent sulfur. The station consumes 1.2 million tons of Illinois coal annually, representing 23 percent of the station's coal receipts. The Illinois coal is supplied by Amax Coal Company and Consolidation Coal Company by spot market, and Zeigler Coal Company through contract. The Illinois coal is received by barge. The major Kentucky coal suppliers are Gatliff Coal Company, Peabody Coal Company and Pyramid Mining Incorporated, all by contract.

Big Bend unit 4 must meet the U.S. Environmental Protection Agency's New Source Performance Standard. To meet the SO2 standard, the station utilizes a limestone FGD system rated at 419 megawatts. The FGD system came on-line in 1984 and is designed to remove about 90 percent of the SO2 emissions. The capital cost and operation and maintenance expenses are not available. Overall, the station has an SO2 emission rate of 2.8 pounds per million BTU of input. Nationally, Big Bend ranks 27th in tons of SO2 emissions. Units 1 through 3 are rated as modest for retrofitting with an FGD system because of age, size and space availability.

The Gannon Station is located in Tampa just north of the Big Bend station. The station has three pulverized coal units and three cyclone units, with capability of 1,104 megawatts. This figure accounts for 36 percent of Tampa's total capability. The three cyclone units represent 35 percent of the station's capability. Gannon's generation of five billion kilowatthours represents 52 percent of its capability and accounts for 37 percent of the company's total generation. Gannon has a production expense of 3.2 cents per kilowatthour with fuel at 2.5 cents.

The 2.2 million tons of coal burned averages 13,013 BTU per pound of coal and 1.1 percent sulfur. Most of the coal is transferred from the Big Bend station. The Kentucky coal is supplied by Gatliff Coal Company under contract. The SO2 emission rate is 1.6 pounds per million BTU of input. Nationally, Gannon is ranked 121st in tons of SO2 emissions. No information is available concerning the FGD retrofit cost and consideration.

Table 3-12 details Tampa's coal-fired generating stations and company data for 1986.

TABLE 3-12
TAMPA ELECTRIC COMPANY
COAL-FIRED GENERATING STATIONS AND STATISTICS
1986

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
BIG BEND	1	1970	372.0	PC	COAL						
	2	1973	362.0	PC	COAL						
	3	1976	396.0	PC	COAL						
	* 4	1984	429.0	PC	COAL						
TOTAL			1,559.0			8,174,650	60	270	2.63	9,898	3,594,000

* Unit 4 is equipped with FGD.

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	FGD REMOVAL (%)	SO2 LB/MMBTU
ILLINOIS	1,217.3	11,118	2.98	9.52	42.97	1.932		5.227
INDIANA	16.4	11,087	2.36	11.20	20.51	0.925		4.151
KENTUCKY	3,537.4	12,241	2.20	7.95	44.91	1.834		3.505
OKLAHOMA	249.4	12,859	0.58	6.28	49.09	1.909		0.880
VIRGINIA	85.5	13,242	0.69	6.36	52.89	1.997		1.016
W. VIRGINIA	74.9	13,097	2.51	9.05	47.75	1.823		3.737
TOTAL	5,180.9	12,032	2.28	8.23	44.75	1.859	90	2.755

TABLE 3-12 (CONTINUED)

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
GANNON	1	1957	103.0	CY	COAL						
	2	1958	108.0	CY	COAL						
	3	1960	150.0	PC	COAL						
	4	1963	178.0	CY	COAL						
	5	1965	217.0	PC	COAL						
	6	1967	348.0	PC	COAL						
TOTAL			1,104.0			5,054,297	52	149	2.86	10,448	2,151,000

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
KENTUCKY	450.9	13,013	1.05	6.18	59.32	2.279	1.573

TOTAL CAPABILITY: 3,027 MEGAWATTS
COAL-FIRED CAPABILITY: 2,663 MEGAWATTS
TOTAL COAL PURCHASES: 5,631,800 TONS
ILLINOIS COAL PURCHASES: 1,217,300 TONS
TOTAL GENERATION: 13.4 BILLION KILOWATTHOURS
COAL-FIRED GENERATION: 13.2 BILLION KILOWATTHOURS

CHAPTER FOUR

GEORGIA

Georgia electric utilities purchased approximately 27 million tons of coal; 0.5 million barrels of petroleum; and six billion cubic feet of natural gas in 1986. For these fossil-fuel categories, coal represented four percent of U.S. utility coal purchases, while petroleum and natural gas were only negligible. On a BTU basis, Georgia utilities purchased four percent of the nation's total fuel for electrical generation. Table 4-1 lists the fossil-fuel sources for Georgia electric utilities during 1986.

TABLE 4-1. GEORGIA FOSSIL-FUEL SOURCES FOR ELECTRIC GENERATION.

FUEL	QUANTITY (000)	BTU (BILLION)	% OF TOTAL	$/UNIT	$/MMBTU
COAL	27,329 tons	663,863	98.6	43.95	1.81
PETROLEUM	539 bls.	3,285	.5	14.12	2.32
NATURAL GAS	5,787 mmcf.	5,926	.9	2.05	2.00
TOTAL		673,073	100.0		

Georgia has two investor-owned utilities; 51 municipal systems; 43 rural electric cooperatives; one state system; two U.S. government installations; and one county system. The major suppliers of electricity are Georgia Power Company, Oglethorpe Power Corporation, Municipal Electric Authority of Georgia, Southeastern Power Administration and Savanna Electric and Power Company. These five utilities account for most of Georgia's electrical generation, with nearly 80 percent of the total generation by Georgia Power Company.

Georgia's electric utilities have 17,678 megawatts of capability. This capability consists of 12,095 megawatts of coal; 1,524 megawatts of nuclear; 1,507 megawatts of petroleum; 2,485 megawatts of hydro; and 67 megawatts of natural gas. Georgia's total capability accounts for three percent of the U.S. total. Of the 44 states that have coal-fired generation, Georgia ranks ninth. As shown in Table 4-2, coal accounts for 68 percent of Georgia's total capability, while the 1,524 megawatts of nuclear represents two percent of the nation's total.

TABLE 4-2. GEORGIA SUMMER CAPABILITY.

TYPE OF CAPABILITY	TOTAL	COAL	NUCLEAR	PETROLEUM	NATURAL GAS	WATER
MEGAWATTS	17,678	12,095	1,524	1,507	67	2,485
NO. OF UNITS	194	38	2	38	5	111
% OF GA TOTAL	100	68	9	9	--	14
% OF U.S. TOTAL	3	4	2	2	--	3

Georgia Power Company will bring one new coal-fired unit and two nuclear units on-line in the future. The coal-fired unit is owned by Georgia Power Company, while the two nuclear units are jointly owned by Georgia Power Company (51%), Oglethorp Power Corporation (30%), Municipal Electric Authority (17%) and the City of Dalton (2%). Table 4-3 details these generating units.

TABLE 4-3. FUTURE BASELOAD CAPABILITY IN GEORGIA.

UTILITY	STATION AND UNIT	CAPABILITY (MW)	FUEL	ON LINE
GEORGIA POWER COMPANY	Scherer 4	755	Coal	1989
	Vogtle 1	1,198	Uranium	1987
	Vogtle 2	1,198	Uranium	1988
TOTAL		3,151		

Net generation by Georgia electric utilities totals 75 thousand gigawatthours, a decrease of seven percent from 1985. Coal generates 87 percent of the total, while nuclear represents most of the remainder. On a national basis, Georgia accounts for three percent of generation and ranks 13th in total generation. Table 4-4 details each category.

TABLE 4-4. GEORGIA NET GENERATION.

TYPE OF CAPABILITY	TOTAL	COAL	NUCLEAR	PETROLEUM	NATURAL GAS	WATER
GIGAWATTHOURS	74,909	64,883	7,238	270	421	2,097
% OF GA TOTAL	100	87	10	--	--	3
% OF U.S. TOTAL	3	5	2	--	--	1

Georgia utilities purchased approximately 27 million tons of coal in 1986. This coal is supplied by seven coal producing states. The sulfur content varies from 0.7 percent to 2.9 percent, with a weighted average of 1.8 percent. The BTU content varies from 11,424 to 12,974 per pound of coal, with an average of 12,146. On a BTU basis, Illinois coal has the lowest delivered price at $1.65 per million BTU, while West Virginia coal is the most expensive at $2.96 per million BTU. Table 4-5 lists the coal supplying states, or regions and their respective quantities and qualities of coal sold to Georgia.

TABLE 4-5. GEORGIA COAL SUPPLIERS.

STATE/REGION	TONS (000)	% OF TOTAL	BTU/LB	% SULFUR	$/TON	$/MMBTU
E. KENTUCKY	11,149	41	12,362	1.46	43.04	1.74
ILLINOIS	5,609	21	11,424	2.47	37.59	1.65
VIRGINIA	3,508	13	12,974	1.12	48.64	1.87
W. KENTUCKY	2,383	9	11,804	2.91	42.74	1.81
TENNESSEE	1,530	5	12,552	1.26	47.47	1.89
INDIANA	1,328	5	11,440	2.50	38.15	1.67
W. VIRGINIA	994	3	12,243	.65	72.57	2.96
ALABAMA	827	3	11,861	2.22	51.20	2.16
TOTAL/AVERAGE	27,328	100	12,146	1.78	43.95	1.81

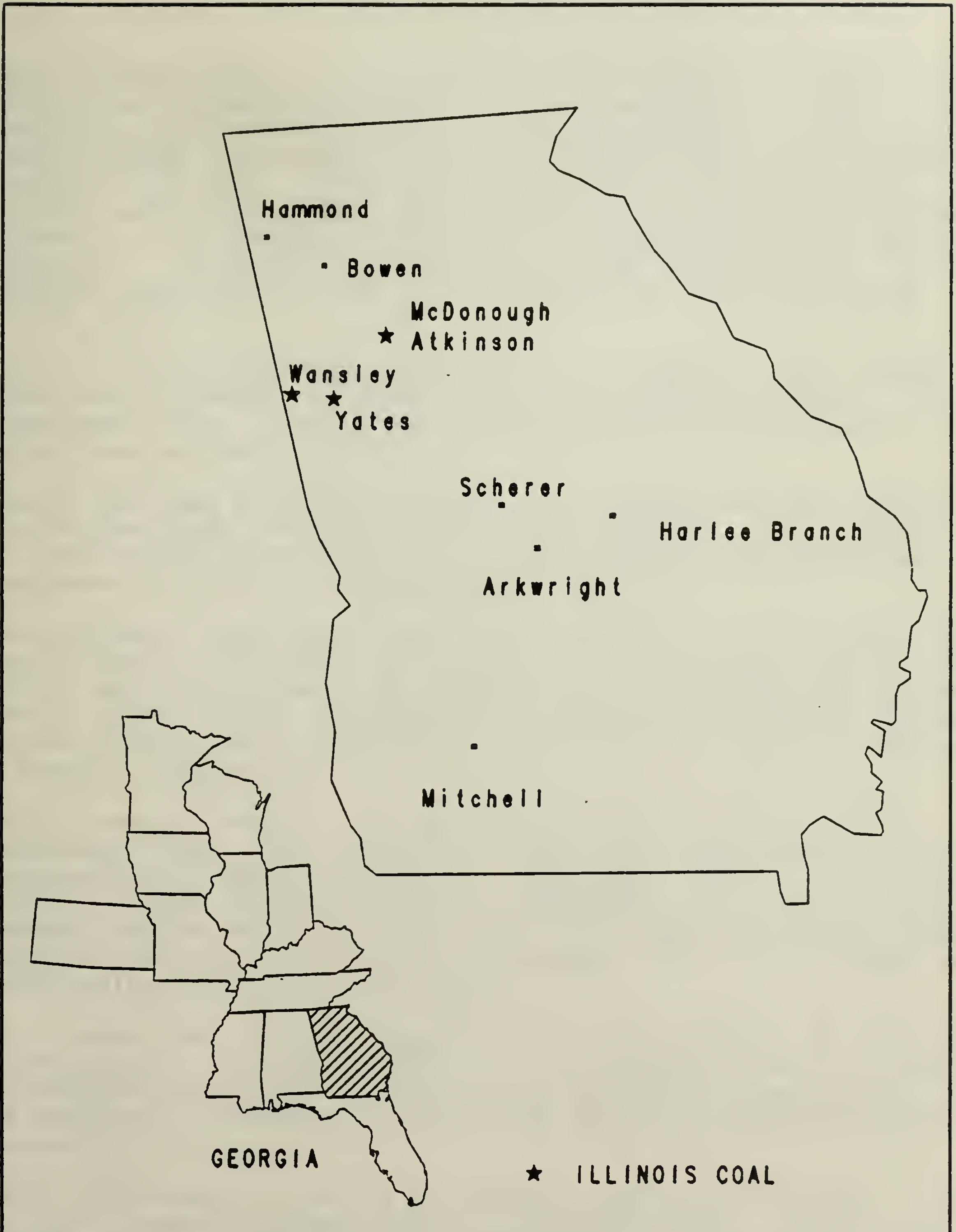
Illinois coal suppliers sold about six million tons of coal to Georgia Power Company in 1986, representing 21 percent of Georgia's total utility coal receipts. Since 1981, Illinois coal sales have increased by one million tons, while the delivered price has stayed about the same. Illinois coal sales, quality of coal and delivered prices to Georgia, for the period 1981 through 1986 are shown in Table 4-6.

TABLE 4-6. GEORGIA'S ILLINOIS COAL PURCHASES, QUALITY OF COAL AND DELIVERED PRICES 1981-1986.

YEAR	1981	1982	1983	1984	1985	1986
THOUSAND TONS	4,507	5,083	5,028	5,472	5,247	5,609
PERCENT SULFUR	2.60	2.70	2.60	2.50	2.60	2.47
BTU/LB	11,279	11,380	11,314	11,369	11,317	11,424
$/TON	36.46	40.13	41.46	39.63	37.31	37.59
$/MMBTU	1.62	1.76	1.83	1.74	1.65	1.65

Map 4-1 shows the locations of Georgia Power Company's coal-fired stations. A discussion of Georgia Power Company and its coal-fired generating stations follows.

MAP 4-1
COAL FIRED GENERATING STATIONS



GEORGIA POWER COMPANY

Georgia Power Company is involved in the generation, purchase and distribution of electricity to more than 600 communities in Georgia. The company also wholesales electricity to 46 municipalities and one county electric system, and provides steam for heating purposes to the business district of Atlanta. Georgia Power's service territory covers about 57 thousand square miles, with a population of 5.1 million and 1.4 million customers. The economic base consists of manufacturing and service industries. The company employs about 14,500. Georgia Power is an operating subsidiary of The Southern Company and is headquartered in Atlanta, Georgia.

Electric sales of 65 billion kilowatthours are valued at $3.4 billion. These sales represent 52 percent of The Southern Company's total kilowatthour sales. Total kilowatthours sold ranks Georgia Power as the largest Georgia electric utility.

Georgia Power owns or partially owns nine coal-fired generating stations, located throughout northern and southwestern Georgia. Not detailed in this section, but shown in Table 4-8, is the Scherer Station which Georgia Power owns 8.4 percent, or 70 megawatts of capability.

The coal-fired capability totals 8,593 megawatts, or 70 percent of Georgia Power's total capability. The company has one operating nuclear station with 1,524 megawatts of capability, representing 12 percent of Georgia Power's total capability. The coal-fired capability further represents 71 percent of the state's coal-fired capability and 49 percent of Georgia's total capability.

Georgia Power has 45,642 miles of above ground lines and 9,005 miles of underground lines. The company has electrical interconnections with Southern Electric Generating Company, Alabama Power Company, Gulf Power Company, Florida Power Corporation, Florida Power and Light Company, Savannah Electric and Power Company, Duke Power Company, Tennessee Valley Authority, South Carolina Electric and Gas Company, City of Tallahasee and South Carolina Public Service Authority.

The company has electric generation of approximately 58 billion kilowatthours. Of this generation, coal accounts for 53 billion kilowatthours or 91 percent, while nuclear generation represents most of the remainder. Statewide, this generation represents 78 percent of total generation.

Georgia Power Company purchased 26.5 million tons of coal in 1986. It is the third largest consumer of coal in the United States. Illinois coal producers supply 5.6 million tons, or 21 percent of this total. Georgia

Power is the fourth largest consumer of Illinois coal. Of these sales, the Wansley station receives 57 percent of the total. Since 1983, Georgia Power has increased its demand for Illinois coal by 12 percent, while the delivered price has decreased by ten percent. Table 4-7 lists Georgia Power's Illinois coal purchases, quality of coal and delivered prices for the past four years.

TABLE 4-7. GEORGIA POWER'S ILLINOIS COAL PURCHASES, QUALITY OF COAL AND DELIVERED PRICES 1983-1986.

YEAR	1983	1984	1985	1986
THOUSAND TONS	5,028	5,472	5,247	5,609
PERCENT SULFUR	2.60	2.50	2.58	2.47
BTU/LB	11,314	11,369	11,302	11,424
$/TON	41.46	39.63	37.29	37.59
$/MMBTU	1.83	1.74	1.65	1.65

The following paragraphs discuss Georgia Power Company's eight coal-fired stations. Table 4-8 provides statistics on these stations and company data. Refer to Map 4-1 for the locations of these stations.

The Arkwright Station is located in central Georgia at Macon. The station consists of four older pulverized coal units with capability of 172 megawatts, representing one percent of the company's total capability. It is the smallest coal-fired station owned by Georgia Power. Arkwright's generation of 0.5 billion kilowatthours is 36 percent of the station's capability and one percent of Georgia Power's total electric generation. The production expense for this station is not available, however, the fuel expense averages 2.5 cents per kilowatthour.

Arkwright consumed 0.3 million tons of coal in 1986. This coal averages 12,651 BTU per pound of coal and two percent sulfur. The SO2 emission rate is three pounds per million BTU of input. No information is available on the FGD retrofit cost and consideration. States supplying coal to this station are Tennessee with 97 percent of the total and Kentucky with the balance. The Tennessee coal is supplied by Royal Fuel Corporation by contract.

The Bowen Station is located in northwestern Georgia at Taylorsville. It consists of four pulverized coal units with capability of 3,075 megawatts. Bowen is the largest station in Georgia Power's system, accounting for 25 percent of the company's capability. It is also one of the largest coal-fired stations in the United States. The station's generation of 21.2 billion kilowatthours accounts for 79 percent of its capability and 36 percent of Georgia Power's total generation. It is Georgia Power's most efficient coal-fired station for which data is available. The average production expense per kilowatthour is two cents, with fuel at 1.7 cents.

The 8.3 million tons of coal purchased and consumed averages 12,199 BTU per pound of coal and 1.8 percent sulfur. The station's SO2 emission rate is 2.8 pounds per million BTU of input. Nationally, it ranks tenth in tons of SO2 emissions. The station is rated easy for FGD retrofit because of age, size and availability of space. Kentucky supplies 100 percent of the coal. The major coal suppliers are Cimarron Coal Corporation, Randall Fuel Company and Straight Creek Mining Company, all by contract.

The Hammond Station is located in northwestern Georgia at Coosa. The station has four pulverized coal units with capability of 805 megawatts, representing seven percent of Georgia Power's total capability. Unit four is the newest and largest with 484 megawatts. The station's generation of five billion kilowatthours represents 71 percent of its capability and accounts for nine percent of the company's total generation. Hammond ranks fifth in economic efficiency. The production expense averages 2.1 cents per kilowatthour. The fuel averages 1.7 cents per kilowatthour.

The station purchased and consumed about 2.1 million tons of coal in 1986. The coal averages 12,558 BTU per pound of coal and 1.7 percent sulfur. The SO2 emission rate is 2.8 pounds per million BTU of input. Hammond ranks 101st in tons of SO2 emissions. Unit 4 is rated as modest for FGD retrofit, while Units 1 through 3 are rated as difficult. The three coal supplying states are Kentucky with (47%), Virginia (44%) and Tennessee (9%). The major Kentucky coal supplier is Greenwood Land and Mining Company by contract. Delta Coal Corporation supplies the Virginia coal under contract.

The Harllee Branch Station is located in central Georgia at Milledgeville. It consists of four pulverized coal units with capability of 1,518 megawatts, or 12 percent of Georgia Power's total capability. The station's generation of 9.8 billion kilowatthours accounts for 74 percent of its capability and 17 percent of Georgia Power's total generation. It is the third most efficient station. The average production expense per kilowatthour is 2.3 cents, with fuel at 1.8 cents.

The 3.9 million tons of coal used in 1986 averages 12,523 BTU per pound of coal and 1.3 percent sulfur. SO2 emissions are about two pounds per million BTU of input. The station ranks 99th nationally in total SO2 emissions. The FGD cost and availability are not available. Kentucky coal producers supply 51 percent of its coal needs, with the remainder from Virginia (25%) and Tennessee (24%). The major Kentucky supplier is Randall Fuel Company by contract. The Virginia coal is supplied by General Coal Company under contract, while the Tennessee coal is furnished by Consolidation Coal Company by contract.

The **McDonough Station** is located in northwestern Georgia near Smyrna. The station has two pulverized coal units with capability of 507 megawatts, accounting for four percent of Georgia Power's total capability. The station's generation of 3.2 billion kilowatthours represents 71 percent of capability and accounts for five percent of the company's total generation. McDonough ranks fourth in economic efficiency. The production expense averages 2.1 cents per kilowatthour, with fuel at 1.9 cents.

The 1.3 million tons of coal purchased and burned averages 11,790 BTU and 2.4 percent sulfur. SO2 emissions are four pounds per million BTU of input. Nationally, McDonough ranks 140th in tons of SO2 emissions. Retrofitting with FGD is rated difficult because of space limitations. Illinois coal producers supply 34 percent of its coal needs, with the remainder from Kentucky. Illinois coal suppliers are Arch of Illinois under contract through June 1994 and Old Ben Coal Company under contract through June 1990. The Illinois coal is received by railroad. The major Kentucky coal suppliers are Cimarron Coal Corporation and Peabody Coal Company, both by contract.

The **Mitchell Station** is located in southwestern Georgia at Albany. Mitchell has three older pulverized coal units with capability of 204 megawatts, representing two percent of Georgia Power's total capability. The station's generation of 1.1 billion kilowatthours represents 60 percent of its capability and accounts for two percent of the company's total generation. Mitchell's production expense is not available, but the fuel expense averages two cents per kilowatthour.

The 0.4 million tons of coal burned averages 12,754 BTU per pound of coal and 1.3 percent sulfur. The SO2 emission rate is 2.1 pounds per million BTU of input. No data is available concerning the SO2 rank or the FGD cost consideration. All of the coal is supplied by Kentucky. Information on the coal supplier is not available.

The **Wansley Station** is a jointly owned facility located in west central Georgia at Roopville. It consists of two pulverized coal units with capability of 1,730 megawatts. The station's generation of 11.1 billion kilowatthours accounts for 73 percent of its capability and 20 percent of Georgia Power's total generation. Wansley is operated by Georgia Power Company. Georgia Power Company owns 54 percent, with the balance owned by Oglethorpe Power Corporation with 30 percent, Municipal Electric Authority at 15 percent and the City of Dalton with less than two percent. The station is the third most efficient station. The average production expense per kilowatthour is two cents, with fuel at 1.8 cents.

The 4.7 million tons of coal purchased and used averages 11,441 BTU per pound of coal and 2.5 percent sulfur. SO2 emissions are 4.2 pounds per million BTU of input. Wansley ranks 13th in tons of SO2 emissions, nationally. FGD cost considerations are not available. Illinois coal producers supply 71 percent of the coal needs, with the remaining 29 percent from Indiana and Virginia. The Illinois coal is supplied by Arch of Illinois under contract through mid 1994 and Old Ben Coal Company by contract through mid 1990. The Illinois coal is transported by rail. The major Indiana coal supplier is Old Ben Coal Company under contract, while the Virginia coal is supplied by Delta Coals Incorporated by contract.

The Yates Station is located in west central Georgia at Newnan. It consists of seven pulverized coal units with capability of 1,250 megawatts, representing ten percent of Georgia Power's total capability. The station's generation of 6.3 billion kilowatthours accounts for 58 percent of its capability and 11 percent of Georgia Power's total generation. It is the least efficient Georgia Power station. The average production expense per kilowatthour is 2.6 cents, with fuel at 2.1 cents.

The 2.9 million tons of coal consumed averages 11,671 BTU per pound of coal and 2.3 percent sulfur. The station's SO2 emission rate is 3.9 pounds per million BTU of input. Nationally, Yates ranks 43rd in total tons of SO2 emissions. No information is available on the FGD retrofit cost and consideration. Illinois is one of five states supplying coal to the station, supplying 63 percent of the coal receipts. The Illinois coal suppliers are Arch of Illinois under contract through June 1994 and Old Ben Coal Company under contract through June 1990. The coal is transported by rail. Other major coal suppliers are Arch of Alabama by contract and Pyro Mining Company of Kentucky through contract.

TABLE 4-8
GEORGIA POWER COMPANY
COAL-FIRED GENERATING STATIONS AND STATISTICS
1986

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
ARKWRIGHT	1	1941	43.1	PC	COAL						
	2	1942	40.2	PC	COAL						
	3	1943	44.0	PC	COAL						
	4	1948	44.2	PC	COAL						
TOTAL			171.5			548,345	36	N.A.	N.A.	12,972	281,000

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
TENNESSEE	348.7	12,667	1.94	10.18	48.13	1.900	2.987
KENTUCKY	10.7	12,327	2.08	8.88	45.29	1.837	3.290
TOTAL	359.4	12,657	1.95	10.14	48.04	1.898	3.004

TABLE 4-8 (CONTINUED)

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
BOWEN	1	1971	677.7	PC	COAL						
	2	1972	668.7	PC	COAL						
	3	1974	852.7	PC	COAL						
	4	1975	876.1	PC	COAL						
TOTAL			3,075.2			21,152,188	79	163	1.96	9,540	8,303,000

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	S02 LB/MMBTU
KENTUCKY	8,356.9	12,199	1.75	10.33	41.78	1.712	2.797

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
HAMMOND	1	1954	106.6	PC	COAL						
	2	1954	108.9	PC	COAL						
	3	1955	105.4	PC	COAL						
	4	1970	483.6	PC	COAL						
TOTAL			804.5			4,980,379	71	145	2.14	10,367	2,059,000

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	S02 LB/MMBTU
KENTUCKY	1,069.3	12,333	1.96	9.20	39.14	1.587	3.099
TENNESSEE	194.0	12,290	1.67	10.85	37.77	1.537	2.650
VIRGINIA	990.9	12,920	1.42	10.21	40.86	1.581	2.143
TOTAL	2,254.2	12,588	1.70	9.79	39.78	1.580	2.633

TABLE 4-8 (CONTINUED)

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
HARLLEE BRANCH	1	1965	251.5	PC	COAL						
	2	1967	319.1	PC	COAL						
	3	1968	471.6	PC	COAL						
	4	1969	475.3	PC	COAL						
TOTAL			1,517.5			9,810,959	74	183	2.06	9,966	3,932,000

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	S02 LB/MMBTU
KENTUCKY	2,005.9	12,383	1.55	10.53	40.30	1.627	2.441
TENNESSEE	908.5	12,551	0.83	9.85	49.41	1.968	1.290
VIRGINIA	973.6	12,769	1.17	10.82	45.44	1.779	1.787
TOTAL	3,888.0	12,523	1.29	10.43	43.67	1.744	2.009

TABLE 4-8 (CONTINUED)

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
MCDONOUGH	1	1963	253.1	PC	COAL						
	2	1964	253.4	PC	COAL						
TOTAL			506.5			3,169,520	71	160	2.11	9,693	1,310,000

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
ILLINOIS	470.9	11,410	2.47	8.85	37.52	1.644	4.221
KENTUCKY	927.4	11,983	2.43	9.80	43.05	1.796	3.954
TOTAL	1,398.3	11,790	2.44	9.48	41.19	1.747	4.036

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
MITCHELL	1	1948	22.0	PC	COAL						
	2	1949	21.2	PC	COAL						
	3	1964	160.3	PC	COAL						
TOTAL			203.5			1,065,116	60	N.A.	N.A.	10,633	444,000

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
KENTUCKY	464.1	12,754	1.32	9.42	48.90	1.917	2.018

TABLE 4-8 (CONTINUED)

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
SCHERER	* 1	1981	835.8	PC	COAL						
	* 2	1983	825.4	PC	COAL						
TOTAL			1,661.2			4,626,170	32	N.A.	N.A.	10,211	1,866,000

* Company owns 8.4% of the station.

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
KENTUCKY	531.9	12,554	0.65	8.81	74.57	2.970	1.010
VIRGINIA	635.3	13,391	0.76	6.72	73.94	2.761	1.107
W. VIRGINIA	986.4	12,241	0.64	10.43	72.82	2.974	1.020
TOTAL	2,153.6	12,658	0.68	8.94	73.58	2.907	1.048

TABLE 4-8 (CONTINUED)

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
WANSLEY	* 1	1976	867.0	PC	COAL						
	* 2	1977	862.9	PC	COAL						
TOTAL			1,729.9			11,109,744	73	268	2.04	9,686	4,726,000

* Company owns 53.5% of the station.

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
ILLINOIS	3,230.8	11,430	2.46	8.83	37.61	1.645	4.197
INDIANA	1,318.2	11,440	2.50	7.44	38.14	1.667	4.261
VIRGINIA	25.6	12,942	1.49	10.44	43.02	1.662	2.245
TOTAL	4,574.6	11,441	2.47	8.44	37.79	1.652	4.210

TABLE 4-8 (CONTINUED)

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
YATES	1	1950	101.1	PC	COAL						
	2	1950	98.9	PC	COAL						
	3	1952	101.7	PC	COAL						
	4	1957	126.2	PC	COAL						
	5	1958	127.0	PC	COAL						
	6	1974	348.5	PC	COAL						
	7	1973	346.1	PC	COAL						
TOTAL			1,249.5			6,348,590	58	181	2.62	10,526	2,877,000

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
ALABAMA	827.3	11,861	2.22	14.76	51.20	2.158	3.650
ILLINOIS	1,907.0	11,417	2.49	8.87	37.58	1.646	4.253
INDIANA	10.0	11,434	2.65	7.40	38.90	1.701	4.519
TENNESSEE	78.3	12,698	2.20	10.27	45.97	1.810	3.378
VIRGINIA	199.0	12,924	1.39	10.41	40.97	1.585	2.097
TOTAL	3,021.6	11,671	2.33	10.62	41.75	1.789	3.893

TOTAL CAPABILITY: 12,335 MEGAWATTS
COAL-FIRED CAPABILITY: 8,593 MEGAWATTS
TOTAL COAL PURCHASES: 26,470,700 TONS
ILLINOIS COAL PURCHASES: 5,608,700 TONS
TOTAL GENERATION: 58.4 BILLION KILOWATTHOURS
COAL-FIRED GENERATION: 53.4 BILLION KILOWATTHOURS

CHAPTER FIVE

ILLINOIS

Illinois electric utilities purchased approximately 33 million tons of coal; 2.6 million barrels of petroleum; and 5.5 billion cubic feet of natural gas in 1986. These fuel categories represent five percent, one percent and 0.2 percent of U.S. electric utility purchases, respectively. On a BTU basis, Illinois utilities purchased four percent of the nation's total BTU receipts. Illinois also has nine nuclear units, but no uranium figures are available concerning receipts and usage. Table 5-1 provides information on the fossil-fuel categories.

TABLE. 5-1. ILLINOIS FOSSIL-FUEL SOURCES FOR ELECTRIC GENERATION.

FUEL	QUANTITY (000)	BTU (BILLION)	% OF TOTAL	$/UNIT	$/MMBTU
COAL	32,966 tons	694,759	96.9	44.71	2.12
PETROLEUM	2,628 bls.	16,467	2.3	31.60	5.04
NATURAL GAS	5,487 mmcf.	5,631	.8	4.74	4.62
TOTAL		716,857	100.0		

Illinois has eight investor-owned utilities; 41 municipal systems and 30 rural electric cooperatives. Of these producers, the four largest are Commonwealth Edison Company, Illinois Power Company, Central Illinois Public Service Company and Central Illinois Light Company. These companies account for almost all of Illinois' electric generation.

Illinois electric utilities have 29,044 megawatts of capability. This capability consists of 15,111 megawatts of coal; 8,379 megawatts of nuclear; 4,541 megawatts of petroleum; 999 megawatts of natural gas; and 14 megawatts of hydro. Table 5-2 shows a breakdown of Illinois' capability. Illinois' capability represents four percent of the U.S. total capability. Of the 45 states with coal-fired capability, Illinois ranks fifth.

TABLE 5-2. ILLINOIS SUMMER CAPABILITY.

TYPE OF CAPABILITY	TOTAL	COAL	NUCLEAR	PETROLEUM	NATURAL GAS	WATER
MEGAWATTS	29,044	15,111	8,379	4,541	999	14
NO. OF UNITS	351	63	9	139	119	21
% OF IL TOTAL	100	52	29	16	3	--
% OF U.S. TOTAL	4	5	10	6	1	--

Illinois has no plans of adding coal-fired generating capability in the near future. However, a number of nuclear units will be on-line in the near term. Three units owned by Commonwealth Edison Company and one unit owned by Illinois Power Company will be started in 1987 and 1988. Table 5-3 provides information on these four units.

TABLE 5-3. FUTURE BASELOAD CAPABILITY IN ILLINOIS.

UTILITY	STATION AND UNIT	CAPABILITY (MW)	FUEL	ON LINE
COMMONWEALTH EDISON	Braidwood 1	1,107	Uranium	1987
	Braidwood 2	1,107	Uranium	1988
	Byron 2	1,107	Uranium	1987
ILLINOIS POWER	Clinton 1	935	Uranium	1987
TOTAL		4,256		

Net generation by Illinois electric utilities totals 107 thousand gigawatthours, an increase of three percent from 1985. Nationally, this generation ranks Illinois as the seventh largest producer of electricity, with four percent of the U.S. total. Coal generates 58 percent of the total, while nuclear generation accounts for most of the balance. Table 5-4 details Illinois' generation by fuel type.

TABLE 5-4. ILLINOIS NET GENERATION.

TYPE OF CAPABILITY	TOTAL	COAL	NUCLEAR	PETROLEUM	NATURAL GAS	WATER
GIGAWATTHOURS	106,892	61,634	42,614	2,036	483	124
% OF IL TOTAL	100	58	40	2	--	--
% OF U.S. TOTAL	4	4	10	1	--	--

Illinois electric utilities purchased approximately 33 million tons of coal, an increase of two million tons since 1985. This coal is supplied by six coal producing states, with Illinois coal operators providing over 50 percent of the total. The sulfur content varies from 0.4 percent to 2.9 percent with a weighted average of 1.8 percent. The BTU content per pound of coal varies from 9,492 to 13,170 with an average of 10,537. On a BTU cost basis, West Virginia coal has the lowest delivered price, while Wyoming and Montana coal are the most expensive. However, Wyoming and Montana coal suppliers provide 36 percent of Illinois' total coal receipts. Table 5-5 lists the various coal supplying states or regions and their respective quantities and qualities of coal sold to Illinois electric utilities.

TABLE 5-5. ILLINOIS COAL SUPPLIERS.

STATE/REGION	TONS (000)	% OF TOTAL	BTU/LB	% SULFUR	$/TON	$/MMBTU
ILLINOIS	17,063	52	10,879	2.89	34.18	1.57
WYOMING	8,620	26	9,503	0.47	65.38	3.44
MONTANA	3,037	10	9,492	0.43	52.34	2.76
E. KENTUCKY	1,424	4	13,170	0.68	44.52	1.69
INDIANA	1,281	4	11,269	1.38	36.03	1.60
W. KENTUCKY	1,123	3	11,304	1.93	39.28	1.74
W. VIRGINIA	418	1	12,245	0.65	34.68	1.42
TOTAL/AVERAGE	32,966	100	10,537	1.82	44.71	2.12

Illinois electric utilities purchased about 17 million tons of Illinois coal, representing 27 percent of Illinois' annual coal production. The largest users of Illinois coal are Illinois Power Company with 6.8 million tons and Central Illinois Public Service Company with 3.8 million tons. Commonwealth Edison Company uses 2.7 million tons of Illinois coal and is the only user of Powder River Basin coal with 13 million tons. Not included in Table 5-5 is Commonwealth Edison Company's Powder River Basin receipts used at its State Line Station located in Indiana. The State Line quantity of coal is shown in the Indiana chapter. The remainder of Illinois coal sales are with Electric Energy Incorporated, Central Illinois Light Company, Springfield Water, Light and Power Department and Southern Illinois Power Cooperative.

Table 5-6 lists the Illinois coal purchases, quality of coal and delivered prices to Illinois electric utilities since 1981.

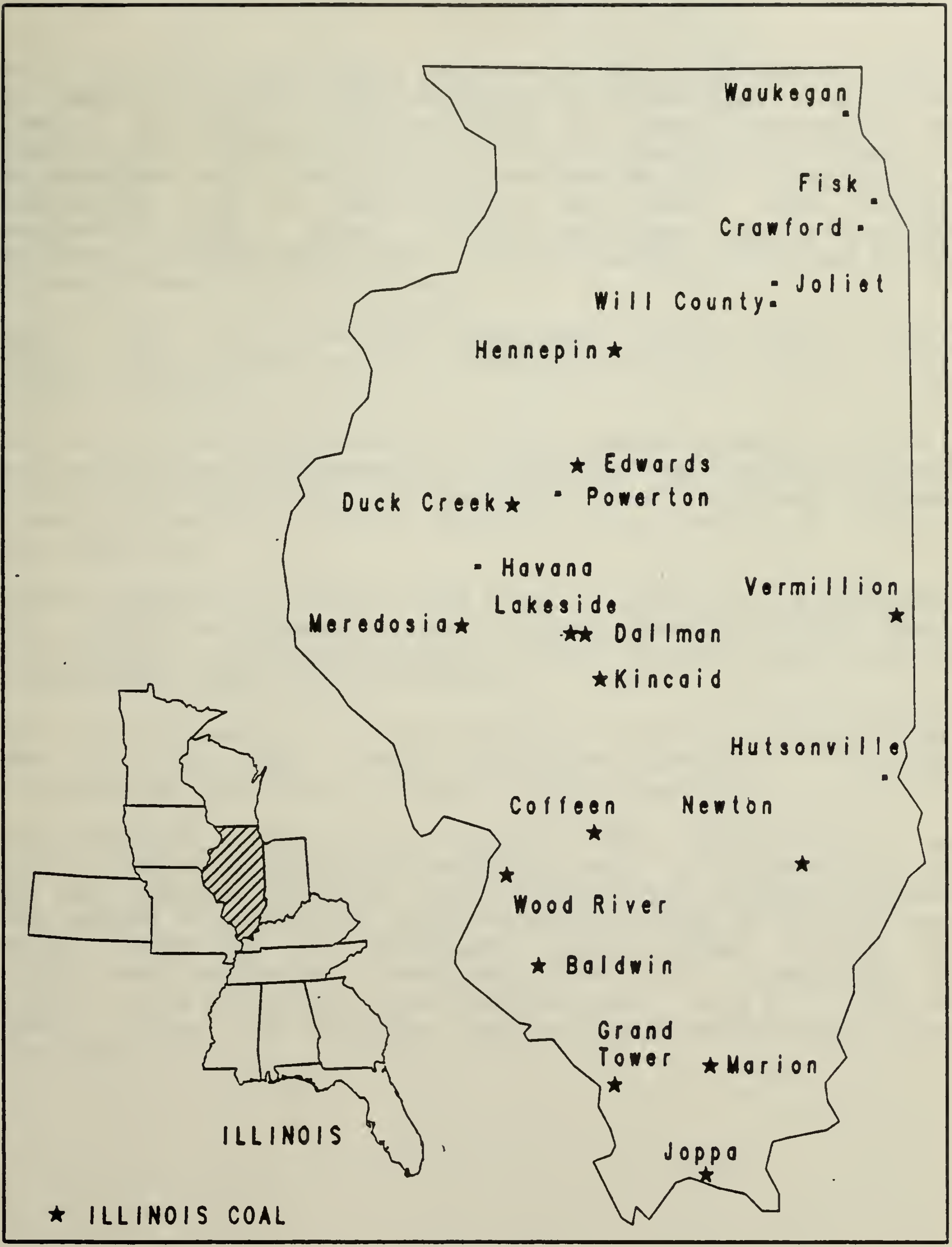
TABLE 5-6. ILLINOIS' ILLINOIS COAL PURCHASES, QUALITY OF COAL AND DELIVERED PRICES 1981-1986.

YEAR	1981	1982	1983	1984	1985	1986
THOUSAND TONS	14,832	16,821	16,365	18,038	16,323	17,063
PERCENT SULFUR	3.00	3.10	3.00	2.90	2.90	2.89
BTU/LB	10,783	10,727	10,755	10,798	10,871	10,879
$/TON	30.77	32.87	33.23	34.78	35.66	34.18
$/MMBTU	1.43	1.53	1.54	1.61	1.64	1.57

The remainder of this chapter discusses the Illinois electric utilities listed above. Map 5-1 shows the locations of the coal-fired generating stations in Illinois. For the Indiana location of Commonwealth Edison Company's State Line Station, see Map 6-1.

MAP 5-1

COAL FIRED GENERATING STATIONS



CENTRAL ILLINOIS LIGHT COMPANY

Central Illinois Light Company (CILCO) is a combination public utility that supplies electricity and natural gas in central and east central Illinois. The service territory covers the Peoria, Springfield and Champaign areas. CILCO supplies electricity to about 182,000 customers in 138 communities, with a population of more than 442,000. Agriculture and manufacturing are the major business activities. CILCO employs approximately 1,600. Central Illinois Light Company is an operating subsidiary of CILCORP Incorporated, a holding company. CILCO and CILCORP are headquartered in Peoria, Illinois.

Electric sales are 4.4 billion kilowatthours, with a value of $298 million. Total kilowatthours sold ranks CILCO fourth in statewide sales and 84th, nationally.

CILCO has two coal-fired generating stations located in central Illinois. These stations have 1,106 megawatts of capability, representing 97 percent of CILCO's total capability. The coal-fired capability accounts for seven percent of Illinois' coal-fired capability and four percent of statewide total capability.

CILCO has 6,285 miles of above ground lines and 1,575 miles of underground lines. Electrical interconnections are with Central Illinois Public Service Company, Commonwealth Edison Company, Illinois Power Company and Springfield City Water, Light and Power.

CILCO has net generation of approximately five billion kilowatthours. Almost all of this total is from the coal-fired capability. Statewide, this generation represents five percent of total generation.

CILCO purchased 2.2 million tons of coal in 1986. Of this total, one Illinois coal producer supplies one million tons, or 45 percent of the total coal receipts. Statewide, CILCO's Illinois coal purchases represent three percent of utility coal purchases and six percent of Illinois coal receipts. Over the last three years, CILCO's annual Illinois coal receipts have leveled off at about one million tons. Since 1983, the delivered price has remained relatively the same. Table 5-7 lists the company's Illinois coal purchases, quality of coal and delivered prices since 1983.

TABLE 5-7. CILCO'S ILLINOIS COAL PURCHASES, QUALITY OF COAL AND DELIVERED PRICES 1983-1986.

YEAR	1983	1984	1985	1986
THOUSAND TONS	647	1,008	994	998
PERCENT SULFUR	3.32	3.31	3.40	3.42
BTU/LB	10,561	10,620	10,550	10,557
$/TON	46.94	47.72	46.10	46.70
$/MMBTU	2.22	2.25	2.18	2.21

The Duck Creek Station is located in north central Illinois near Canton. The station consists of one pulverized coal unit with capability of 366 megawatts. This figure represents 32 percent of CILCO's total capability. Duck Creek's generation of 1.6 billion kilowatthours represents 49 percent of its capability and 32 percent of CILCO's total generation. The production expense averages 3.1 cents per kilowatthour, with the fuel expense at 2.3 cents. Duck Creek is the second most efficient CILCO plant. The 0.8 million tons of Illinois coal consumed averages 10,563 BTU per pound of coal and 3.4 percent sulfur. The coal is supplied by Freeman United Coal Mining Company under contract through 1997, and received by rail.

Duck Creek meets The U.S. Environmental Protection Agency's New Source Performance Standard. It utilizes a limestone FGD system rated at 378 megawatts. The system came on-line in 1976 and is designed to remove about 85 percent of the SO2 emissions. The capital cost was $132 per kilowatt, while the operation and maintenance expense averages six mills per kilowatthour. The station has an SO2 emission rate of 1.2 pounds per million BTU of input.

The Edwards Station is located in north central Illinois near Pekin. The station has three pulverized coal units with capability of 740 megawatts, representing 68 percent of CILCO's total capability. Edwards' generation of 3.4 billion kilowatthours represents 53 percent of its capability and accounts for 68 percent of CILCO's total generation. Edwards is the most efficient station in the CILCO system, with a production expense of 2.1 cents per kilowatthour. The fuel expense averages 1.8 cents per kilowatthour.

The 1.3 million tons of coal burned averages 13,074 BTU per pound of coal and 0.9 percent sulfur. The SO2 emission rate is 1.3 pounds per million BTU of input. Edwards is not listed as a major emitter of SO2, nor is information available on the cost and availability of FGD retrofit. Freeman United Coal Mining Company supplies the Illinois coal under contract. The contract runs through 1997. The coal is received by rail. The Kentucky coal is supplied by Blue Diamond Mining Incorporated and Lake Coal Company, both by contract.

Table 5-8 provides additional information on the utility and coal-fired generation. See Map 5-1 for the locations of these stations.

TABLE 5-8
CENTRAL ILLINOIS LIGHT COMPANY
COAL-FIRED GENERATING STATIONS AND STATISTICS
1986

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
DUCK CREEK	* 1	1976	366.0	PC	COAL	1,571,253	49	566	3.14	10,526	778,000

* Unit 1 is equipped with FGD.

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	FGD REMOVAL (%)	SO2 LB/MMBTU
ILLINOIS	897.0	10,563	3.43	8.29	45.61	2.159	85	1.200

TABLE 5-8 (CONTINUED)

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
EDWARDS	1	1960	117.0	PC	COAL						
	2	1968	262.0	PC	COAL						
	3	1972	361.0	PC	COAL						
TOTAL			740.0			3,443,260	53	238	2.13	9,895	1,308,000

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
ILLINOIS	101.0	10,542	3.41	8.35	48.94	2.321	6.308
KENTUCKY	1,155.0	13,295	0.69	5.48	46.46	1.747	1.012
TOTAL	1,256.0	13,074	0.91	5.71	46.66	1.785	1.283

TOTAL CAPABILITY: 1,136 MEGAWATTS
COAL-FIRED CAPABILITY 1,106 MEGAWATTS
TOTAL COAL PURCHASES: 2,153,000 TONS
ILLINOIS COAL PURCHASES: 998,000 TONS
TOTAL GENERATION: 5.0 BILLION KILOWATTHOURS
COAL-FIRED GENERATION: 5.0 BILLION KILOWATTHOURS

CENTRAL ILLINOIS PUBLIC SERVICE COMPANY

Central Illinois Public Service Company (CIPS) is an investor-owned utility operating in central and southern Illinois. CIPS is engaged in the business of generating, purchasing and selling of electricity, and purchasing and distributing of natural gas. CIPS serves approximately 304 thousand electric customers in 367 incorporated and 183 unincorporated communities, and nearby suburban and rural areas. CIPS also supplies 17 rural electric cooperatives at wholesale. The service territory is located in 65 Illinois counties with approximately 820,000 population. The primary business activities are agriculture, manufacturing and mining. The Company employs approximately 2,900. CIPS is headquartered in Springfield, Illinois.

Electric sales total about 7.5 billion kilowatthours, valued at $494 million. Based on sales, CIPS is the third largest Illinois electric utility and ranks 67th, nationally.

CIPS has five coal-fired generating stations located throughout central and southern Illinois. These five stations' capability is 2,618 megawatts, representing 94 percent of CIPS' total capability. This figure represents 17 percent of Illinois' coal-fired capability and nine percent of Illinois' total capability. CIPS also owns 20 percent of Electric Energy, Incorporated located in southern Illinois at Joppa.

Electric generation by CIPS is approximately ten billion kilowatthours. Almost all of the generation is by coal. Statewide, this generation accounts for nine percent of total generation.

CIPS has 8,282 miles of above ground lines and 605 miles of underground lines. The distribution of electricity to all of its customers starts from the CIPS load center at Pana. CIPS has major interconnections with Commonwealth Edison Company, Indiana and Michigan Electric Company, Electric Energy Incorporated, Union Electric Company, Illinois Power Company, Public Service Company of Indiana, Southern Illinois Power Cooperative, Tennessee Valley Authority, Kentucky Utilities Company, Central Illinois Light Company and Springfield City, Water, Light and Power Department.

CIPS purchased 4.9 million tons of coal in 1986. Illinois coal receipts are 3.8 million tons, representing 78 percent of the total. Statewide, CIPS' Illinois coal purchases represent 12 percent of utility coal purchases and 22 percent of Illinois coal receipts. Since 1983, CIPS' Illinois coal demand has been about four million tons, annually. The delivered price has also been constant at about $1.64 per million BTU. Table 5-9 details CIPS' Illinois coal receipts for the last four years.

TABLE 5-9. CIPS' ILLINOIS COAL PURCHASES, QUALITY OF COAL AND DELIVERED PRICES 1983-1986.

YEAR	1983	1984	1985	1986
THOUSAND TONS	3,947	3,996	3,732	3,778
PERCENT SULFUR	3.32	3.21	3.18	3.22
BTU/LB	10,949	11,013	11,022	11,004
$/TON	36.35	36.74	38.19	37.82
$/MMBTU	1.66	1.67	1.73	1.72

The Coffeen Station is located in south central Illinois near Coffeen. The station consists of two cyclone units rated at 325 and 550 megawatts. The station represents 31 percent of CIPS' total capability. Generation of 3.8 billion kilowatthours represents 49 percent of its capability and 39 percent of CIPS' total generation. The production expense averages 2.2 cents per kilowatthour, with fuel at 1.9 cents. The Coffeen station ranks second in economic efficiency.

The two million tons of Illinois coal consumed averages 10,484 BTU per pound of coal and 3.7 percent sulfur. Coffeen has an SO2 emission rate of seven pounds per million BTU of input. Nationally, Coffeen ranks 24th in tons of SO2 emissions. The station is rated as easy for FGD retrofit because of age, size and space availability. The Illinois coal is supplied by Monterey Coal Company under contract through 2003. The coal is received by rail.

The Grand Tower Station is located in southwestern Illinois at Grand Tower. The two older pulverized coal units are rated at 171 megawatts of capability, representing six percent of CIPS' total capability. Generation of 0.7 billion kilowatthours represents 47 percent of its capability and accounts for seven percent of CIPS' total generation. The average production expense is 2.4 cents per kilowatthour, with fuel at 1.5 cents. Grand Tower ranks fourth in economic efficiency.

The station consumed 0.3 million tons of Illinois coal in 1986. This coal averages 11,525 BTU per pound of coal and 2.8 percent sulfur. SO2 emissions are 4.8 pounds per million BTU of input. Grand Tower ranks 188th in total tons of SO2 emissions. FGD retrofit is rated as very difficult because of age and limited space. The coal is supplied by Amax Coal Company under contract through 1997; Kenellis Energy Incorporated by contract; and Old Ben Coal Company by spot market. The coal is received by rail.

The Hutsonville Station is located near the Illinois-Indiana border at Hutsonville. The station consists of two older pulverized coal units with capability of 75 megawatts, each. Hutsonville accounts for five percent of CIPS' total capability. Electrical generation totals one billion kilowatthours, or 78 percent of station capability and ten percent of CIPS' total generation. The station is the most efficient CIPS station with an average production expense of 1.8 cents per kilowatthour. Of this total, the fuel expense averages 1.3 cents.

The two units consume approximately 0.5 million tons of Indiana coal, annually. This coal averages 2.6 percent sulfur and 11,140 BTU per pound of coal. The station has an SO2 emission rate of 4.5 pounds. Hutsonville is not ranked in the top 200 SO2 emitting stations, nor are FGD cost and consideration available. The major Indiana coal suppliers are Black Beauty Coal Company by contract through June 1990 and Amax Coal Company by spot market.

The Meredosia Station is located in west central Illinois at Meredosia. The station consists of three older pulverized coal units with 482 megawatts of capability. This capability represents 11 percent of CIPS' total capability. Generation of 1.3 billion kilowatthours represents 49 percent of its capability and 13 percent of CIPS' total generation. The station has an average production expense of 2.1 cents per kilowatthour, with fuel accounting for 71 percent of the total. Meredosia is CIPS' second most efficient station.

The three units consume 0.6 million tons of Illinois coal. The coal averages 11,422 BTU per pound of coal and 2.5 percent sulfur. SO2 emissions are 4.3 pounds per million BTU of input. Nationally, Meredosia ranks 103rd in tons of SO2 emissions. The station is rated as very difficult to retrofit with FGD because of age, size and space limitations. Black Beauty Coal Company supplies the Illinois coal under contract through 1997. The coal is received by truck.

The Newton Station is located in south central Illinois at Newton. It is the newest and largest CIPS station. The two pulverized coal units are rated at 550 megawatts and 560 megawatts. This capability represents 40 percent of CIPS' total capability. The three billion kilowatthours of generation represents 30 percent of its capability and accounts for 31 percent of CIPS' total generation. The production and fuel expenses average 2.7 cents per kilowatthour and 2.1 cents per kilowatthour, respectively. This cost ranks Newton last in economic efficiency.

The 1.4 million tons of Illinois and Indiana coal averages 11,606 BTU per pound of coal and 1.8 percent sulfur. Amax Coal Company supplies the Illinois coal under contract through 1997. The Illinois coal is received by rail. The major Indiana coal supplier is B & L.S. Contracting Incorporated by contract.

Newton's Unit 1 utilizes a dual alkali FGD system rated at 575 megawatts with 90 percent SO2 removal, while Unit 2 operates as a cycling unit utilizing Indiana low sulfur coal. The SO2 emission rate is about 1.1 pounds per million BTU of input. Both units meet the U.S. Environmental Protection Agency's New Source Performance Standard.

Table 5-10 provides additional data on the coal-fired generating stations and company data. For the location of these stations see Map 5-1.

TABLE 5-10
CENTRAL ILLINOIS PUBLIC SERVICE
COAL-FIRED GENERATING STATIONS AND STATISTICS
1986

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
COFFEEN	1	1965	325.0	CY	COAL						
	2	1972	550.0	CY	COAL						
TOTAL			875.0			3,752,825	49	237	2.24	10,805	1,932,277

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
ILLINOIS	1,967.1	10,484	3.74	9.23	36.42	1.737	6.956

TABLE 5-10 (CONTINUED)

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
GRAND-	3	1951	75.0	PC	COAL						
TOWER	4	1958	102.0	PC	COAL						
TOTAL			177.0			729,881	47	232	2.43	10,901	345,294

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	S02 LB/MMBTU
ILLINOIS	340.0	11,525	2.82	11.98	32.28	1.400	4.771

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
HUTSON-	3	1953	75.0	PC	COAL						
VILLE	4	1954	75.0	PC	COAL						
TOTAL			150.0			1,023,993	78	236	1.82	10,526	488,081

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	S02 LB/MMBTU
INDIANA	463.3	11,140	2.55	9.39	28.20	1.266	4.464

TABLE 5-10 (CONTINUED)

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
MEREDOSIA	1	1948	63.0	PC	COAL						
	2	1948	63.0	PC	COAL						
	3	1960	180.0	PC	COAL						
TOTAL			306.0			1,307,217	49	206	2.10	10,168	593,696

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
ILLINOIS	600.0	11,422	2.51	5.46	33.44	1.464	4.285

TABLE 5-10 (CONTINUED)

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
NEWTON	* 1	1977	550.0	PC	COAL						
	2	1982	560.0	PC	COAL						
TOTAL			1,110.0			2,963,483	30	550	2.71	10,766	1,364,068

* Unit 1 is equipped with FGD.

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	FGD REMOVAL (%)	SO2 LB/MMBTU
ILLINOIS	870.9	11,688	2.67	10.84	46.16	1.975		4.455
INDIANA	682.2	11,502	0.59	6.42	43.74	1.901		1.000
TOTAL	1,553.1	11,606	1.76	8.90	45.10	1.943	90	1.100

TOTAL CAPABILITY:	2,797 MEGAWATTS
COAL-FIRED CAPABILITY:	2,618 MEGAWATTS
TOTAL COAL PURCHASES:	4,923,500 TONS
ILLINOIS COAL PURCHASES:	3,778,000 TONS
TOTAL GENERATION:	9.7 BILLION KILOWATTHOURS
COAL-FIRED GENERATION:	9.7 BILLION KILOWATTHOURS

COMMONWEALTH EDISON COMPANY

Commonwealth Edison Company (COMED) is an investor-owned electric utility operating in northern Illinois. The company is engaged in the production, purchase, transmission, distribution and sale of electricity to about three million customers. COMED supplies electricity to 393 communities in northern Illinois. The company's service territory covers approximately 11,525 square miles with a population of eight million. Most of the electric sales are derived from Chicago and the surrounding area. Commonwealth Edison employs 18,400 statewide, with the main office in Chicago, Illinois.

COMED's electric sales are 65 billion kilowatthours, valued at $5.4 billion. Based on electric sales, COMED is the largest Illinois electric utility with 60 percent. Nationwide, the company ranks fourth.

COMED has eight coal-fired stations totalling 6,940 megawatts of capability and five nuclear stations with 7,995 megawatts of capability. The coal-fired capability represents 37 percent of COMED's total capability and 46 percent of Illinois' coal-fired capability. COMED's nuclear capability accounts for 44 percent of the company's capability and ten percent of the U.S. nuclear capability. On a national basis, COMED ranks fifth in utility coal receipts and first in nuclear generation.

COMED has 62 thousand miles of above ground lines and 577 miles of underground cable. The company has electrical interconnections with Central Illinois Light Company, Central Illinois Public Service Company, Illinois Power Company, Indiana and Michigan Electric Company, Iowa Illinois Gas and Electric Company, Interstate Power Company, Northern Indiana Public Service Company, Wisconsin Electric Power Company and Wisconsin Power and Light Company.

Commonwealth Edison has net generation of 69 billion kilowatthours. Coal generation totals 24 billion kilowatthours or 35 percent of COMED's total generation. Nuclear generation of 43 billion kilowatthours accounts for most of the remainder. Statewide, COMED accounts for 64 percent of the total electrical generation.

COMED purchased 16 million tons of coal in 1986. Of this total, one Illinois coal producer, Peabody Coal Company supplies about 2.7 million tons, or 17 percent of the company's total coal demand. All of COMED's stations, except for the Kincaid Station, are using a western low sulfur coal. Statewide, COMED's Illinois coal purchase represents eight percent of all coal purchases and 16 percent of Illinois coal receipts. Table 5-11 shows COMED's Illinois coal purchases, quality of coal and delivered prices for the period 1983 through 1986. As shown in the table, the demand for Illinois coal has steadily declined as additional nuclear capability comes on-line. Also, the delivered price has decreased by 16 percent from 1985.

TABLE 5-11. COMMONWEALTH EDISON'S ILLINOIS COAL PURCHASES, QUALITY OF COAL AND DELIVERED PRICES 1983-1986.

YEAR	1983	1984	1985	1986
THOUSAND TONS	3,234	3,005	2,517	2,732
PERCENT SULFUR	3.43	3.35	3.30	3.36
BTU/LB	10,211	10,300	10,283	10,268
$/TON	30.84	34.68	35.68	30.13
$/MMBTU	1.51	1.68	1.71	1.47

The following section discusses Commonwealth Edison's seven coal-fired stations in Illinois and the one station located in northern Indiana. Table 5-12 at the end of this narrative provides additional data on the generating stations and systemwide data.

The Crawford Station consists of two pulverized coal units located in northeastern Illinois at Chicago. The 532 megawatts of capability accounts for three percent of COMED's total capability. Crawford has a 29 percent capability factor with generation of 1.4 billion kilowatthours. This figure is two percent of COMED's total generation. The station ranks seventh in economic efficiency, primarily because of the high cost of the Wyoming and Montana coals. Crawford's fuel expense is 4.4 cents per kilowatthour.

The station purchased and consumed about 0.8 million tons of coal. The compliance coal is used to meet the SO2 emissions standards established for the Chicago area. The coal averages 9,576 BTU per pound of coal and 0.5 percent sulfur. Crawford has a 0.9 pound of SO2 per million BTU emission rate. The coal is supplied by Big Horn Coal Company and Black Butte Coal Company, under contract.

The Fisk Station, located near the Crawford station in Chicago, consists of one pulverized coal unit. The station's capability is rated at 316 megawatts and represents two percent of the company's capability. Fisk's generation of 0.6 billion kilowatthours is 20 percent of its capability and less than one percent of COMED's total generation. Fisk is COMED's least efficient coal-fired station, with a production expense of 6.5 cents per kilowatthour.

The station purchased and used about 0.4 million tons of Montana and Wyoming coal. The BTU and sulfur content are 9,575 and 0.5 percent, respectively. The SO2 emission rate is about 0.9 pound per million BTU. The coal is supplied through Black Butte Coal Company of Wyoming and Decker Coal Company of Montana, both by contract.

The Joliet Station, located in northeastern Illinois at Joliet, consists of one cyclone unit and two pulverized coal units. The capability is 1,309 megawatts and accounts for six percent of COMED's total capability. Joliet's generation of 4.5 billion kilowatthours represents 39 percent of its capability and seven percent of COMED's total generation. The cost per kilowatthour is 4.7 cents, ranking sixth in overall efficiency. The fuel expense accounts for 77 percent of this total.

The 2.5 million tons of coal consumed at the Joliet station averages 9,520 BTU per pound of coal and 0.5 percent sulfur. The SO2 rate is less than one pound per million BTU of input. The Wyoming coal is supplied by Black Butte Coal Company and the Montana coal is supplied by Decker Coal Company, both by contract.

The Kincaid Station, located in south central Illinois near Kincaid, consists of two cyclone units with a combined capability of 1,108 megawatts. The station accounts for six percent of COMED's total capability. Kincaid's generation is five billion kilowatthours, representing 51 percent of the station's capability and seven percent of COMED's total generation. The production cost per kilowatthour is 2.4 cents. Kincaid is COMED's most efficient fossil-fuel station. The fuel expense is 1.9 cents per kilowatthour.

Kincaid is Commonwealth Edison's only station that utilizes a large quantity of Illinois coal. The station uses about 2.7 million tons of coal annually. The coal averages 10,268 BTU per pound of coal and 3.4 percent sulfur. SO2 emissions are 6.4 pounds per million BTU of input. Nationwide, Kincaid ranks 14th in tons of SO2 emissions. The station is rated modest for FGD retrofit because of its age, cost and availability of space. The mine-mouth coal is supplied by Peabody Coal Company and delivered by conveyor belt. The contract is scheduled to expire at the end of 1992.

The Powerton Station is located in north central Illinois, near Pekin. The station consists of two relatively new cyclone units, rated at 1,400 megawatts of capability. The station represents seven percent of the company's total capability. The 5.2 billion kilowatthours of generation accounts for 42 percent of its capability and eight percent of COMED's total generation. The production expense is 3.8 cents per kilowatthour, with fuel at 3.2 cents. Powerton is the second most efficient fossil-fuel station.

Powerton purchased four million tons of coal and consumed 3.1 million tons. The coal averages 9,409 BTU and 0.5 percent sulfur. SO2 emissions are a little less than one pound per million BTU of input. The Montana coal is supplied by Decker Coal Company, while the Wyoming coal is produced by Big Horn Coal Company and Black Butte Coal Company. All three companies are under contract.

The State Line Station is located in northwestern Indiana at Hammond. The station consists of one cyclone unit and one pulverized coal unit. The 490 megawatts of capability represents three percent of the company's total capability. The two billion kilowatthours of generation accounts for 48 percent of its capability and three percent of COMED's total generation. The production expense is 3.8 cents per kilowatthour, ranking third in economic efficiency.

State Line purchased 1.4 million tons of coal and consumed 1.1 million tons. The coal averages 9,481 BTU per pound of coal and 0.4 percent sulfur. SO2 emissions are 0.9 pound per million BTU of input. The Montana coal is supplied by Decker Coal Company, under contract. Refer to Map 6-1 for the location of this station.

The Waukegan Station is located in Waukegan, at the northeastern tip of Illinois. The one cyclone unit and two pulverized coal units are rated at 725 megawatts of capability, or four percent of COMED's total capability. The station produces four percent of COMED's generation with 2.3 billion kilowatthours. This figure also represents 36 percent of the station's capability. The 4.5 cents per kilowatthour ranks fourth in economic efficiency.

The 1.3 million tons of coal purchased and consumed averages 9,502 BTU per pound of coal and 0.5 percent sulfur. The SO2 emission rate is slightly less than one pound per million BTU of input. The Montana coal is supplied by Decker Coal Company, while the Wyoming coal is produced by Big Horn Coal Company and Black Butte Coal Company, all three under contract.

The Will County Station is located in northeastern Illinois, near Lockport. The station consists of two cyclone and two pulverized coal units. Its capability is 1,060 megawatts, representing six percent of COMED's total capability. Will County's generation of 3.2 billion kilowatthours represents 35 percent of the station's capability and five percent of the company's total generation. Will County ranks fifth in economic efficiency at 4.5 cents per kilowatthour.

Will County purchased 2.2 million tons of coal and consumed 1.8 million tons. The coal averages 9,532 BTU per pound of coal and 0.5 percent sulfur. SO2 emissions are 0.9 pound per million BTU of input. The Montana coal is supplied by Decker Coal Company, while the Wyoming coal is produced by Big Horn Coal Company and Black Butte Coal Company, all by contract. The small quantity of Illinois coal is supplied by Peabody Coal Company, by contract, and transported by rail carrier.

TABLE 5-12
COMMONWEALTH EDISON COMPANY
COAL-FIRED GENERATING STATIONS AND STATISTICS
1986

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
CRAWFORD	7	1958	213.0	PC	COAL						
	8	1961	319.0	PC	COAL						
TOTAL			532.0			1,362,363	29	216	5.43	10,833	795,467

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
WYOMING	891.2	9,576	0.46	7.40	71.59	3.738	0.937

TABLE 5-12 (CONTINUED)

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
FISK	19	1959	316.0	PC	COAL						
TOTAL			316.0			563,144	20	271	6.50	11,283	359,469

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	S02 LB/MMBTU
MONTANA	1.0	9,587	0.44	4.30	54.93	2.865	0.895
WYOMING	399.0	9,575	0.46	7.49	71.59	3.738	0.937
TOTAL	400.0	9,575	0.46	7.48	71.54	3.736	0.937

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
JOLIET	6	1959	292.0	CY	COAL						
	7	1965	499.0	PC	COAL						
	8	1966	518.0	PC	COAL						
TOTAL			1,309.0			4,501,949	39	180	4.68	10,637	2,521,549

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	S02 LB/MMBTU
MONTANA	231.0	9,544	0.42	4.38	53.94	2.826	0.858
WYOMING	2,579.0	9,518	0.47	6.92	66.22	3.479	0.963
TOTAL	2,810.0	9,520	0.47	6.71	65.21	3.425	0.963

TABLE 5-12 (CONTINUED)

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
KINCAID	1	1967	554.0	CY	COAL						
	2	1968	554.0	CY	COAL						
TOTAL			1,108.0			4,969,584	51	218	2.44	11,141	2,699,376

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	S02 LB/MMBTU
ILLINOIS	2,730.0	10,268	3.36	9.67	30.13	1.467	6.381

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
POWERTON	5	1972	700.0	CY	COAL						
	6	1975	700.0	CY	COAL						
TOTAL			1,400.0			5,173,488	42	321	3.77	11,410	3,121,021

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	S02 LB/MMBTU
MONTANA	2,335.0	9,489	0.43	4.62	51.47	2.712	0.884
WYOMING	1,607.0	9,352	0.48	5.04	54.22	2.899	1.001
TOTAL	3,942.0	9,433	0.45	4.79	52.59	2.788	0.930

TABLE 5-12 (CONTINUED)

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
STATE LINE	3	1955	187.0	PC	COAL						
	4	1962	303.0	CY	COAL						
TOTAL			490.0			2,055,302	48	N.A.	N.A.	10,047	1,092,000

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
MONTANA	1,384.0	9,481	0.43	4.64	53.93	2.844	0.884

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
WAUKEGAN	6	1951	100.0	CY	COAL						
	7	1958	328.0	PC	COAL						
	8	1962	297.0	PC	COAL						
TOTAL			725.0			2,285,697	36	249	4.52	10,324	1,243,827

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
MONTANA	154.0	9,509	0.43	4.52	54.24	2.852	0.882
WYOMING	1,291.0	9,534	0.47	7.11	64.29	3.372	0.961
TOTAL	1,445.0	9,532	0.47	6.83	63.22	3.316	0.961

TABLE 5-12 (CONTINUED)

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
WILL COUNTY	1	1955	151.0	CY	COAL						
	2	1955	148.0	CY	COAL						
	3	1957	251.0	PC	COAL						
	4	1963	510.0	PC	COAL						
TOTAL			1,060.0			3,205,276	35	218	4.54	10,454	1,805,623

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
ILLINOIS	2.3	10,208	3.44	10.16	30.83	1.510	6.571
MONTANA	315.5	9,471	0.44	4.66	56.62	2.989	0.906
WYOMING	1,853.1	9,541	0.46	7.12	70.34	3.686	0.940
TOTAL	2,170.9	9,532	0.46	6.77	68.30	3.583	0.941

TOTAL CAPABILITY:	18,769 MEGAWATTS
COAL-FIRED CAPABILITY:	6,940 MEGAWATTS
TOTAL COAL PURCHASES:	15,871,100 TONS
ILLINOIS COAL PURCHASES:	2,732,300 TONS
TOTAL GENERATION:	69 BILLION KILOWATTHOURS
COAL-FIRED GENERATION:	24 BILLION KILOWATTHOURS

Electric Energy Incorporated (EEI) is a jointly owned utility located in southern Illinois at Joppa. EEI supplies electricity in Illinois and Kentucky. The utility is jointly owned by Union Electric Company (40%); Central Illinois Public Service Company (20%); Illinois Power Company (20%); and Kentucky Utilities Company (20%). EEI has interconnections with Central Illinois Public Service Company, Illinois Power Company, Kentucky Utilities Company and Union Electric Company.

EEI sold 6.3 billion kilowatthours, valued at $147 million in 1986. EEI's customers are the U.S. Department of Energy (USDOE) in Paducah, Kentucky and the four partner utilities listed above. Sales to USDOE are based on a percentage of capacity at EEI's Joppa Station and are in force until December 31, 1989, unless terminated or extended.

EEI has one coal-fired generating station which represents all of EEI's generating capability and accounts for seven percent of Illinois' coal-fired capability and three percent of Illinois' total capability. EEI's generation of 5.3 billion kilowatthours, represents five percent of Illinois' total electrical generation.

EEI purchased and consumed 2.3 million tons of coal in 1986. Two Illinois coal producers supply about 50 percent of Joppa's coal demand. Statewide, EEI's Illinois coal purchases represent four percent of utility coal purchases and seven percent of Illinois coal receipts. Table 5-13 lists EEI's Illinois coal purchases for the past four years.

TABLE 5-13. EEI'S ILLINOIS COAL PURCHASES, QUALITY OF COAL AND DELIVERED PRICES 1983-1986.

YEAR	1983	1984	1985	1986
THOUSAND TONS	1,183	1,580	1,678	1,392
PERCENT SULFUR	2.03	1.93	1.85	1.59
BTU/LB	12,041	12,011	12,003	12,014
$/TON	42.98	42.41	41.96	40.26
$/MMBTU	1.79	1.77	1.75	1.68

The Joppa Station has six older pulverized coal units with a total capability of 1,014 megawatts. The station's generation of 5.3 billion kilowatthours represents 59 percent of its capability. The production expense averages 2.2 cents per kilowatthour, with fuel at 1.8 cents.

The 2.3 million tons of coal averages 11,682 BTU per pound of coal and 1.8 percent sulfur. SO2 emission are 3.3 pounds per million BTU of input. Nationally, Joppa ranks 45th in tons of SO2 emissions. Because of the station's age and limited space, FGD retrofit is unlikely. Suppliers of Illinois coal are Freeman United Coal Mining Company and Sahara Coal Company. Both contracts are scheduled to terminate at the end of 1989. The coal is transported by rail. The Kentucky coal is supplied by Peabody Coal Company under contract through 1989. Table 5-14 details the Joppa station and provides EEI system data.

TABLE 5-14
ELECTRIC ENERGY, INCORPORATED
COAL-FIRED GENERATING STATION AND STATISTICS
1986

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
JOPPA	1	1953	169.0	PC	COAL						
	2	1953	169.0	PC	COAL						
	3	1954	169.0	PC	COAL						
	4	1954	169.0	PC	COAL						
	5	1955	169.0	PC	COAL						
	6	1955	169.0	PC	COAL						
TOTAL			1,014.0			5,257,290	59	185	2.21	10,335	2,338,545

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
ILLINOIS	1,183.1	12,041	2.03	9.29	42.98	1.785	3.288
KENTUCKY	1,123.1	11,304	1.93	8.97	39.28	1.738	3.329
TOTAL	2,306.2	11,682	1.98	9.13	41.18	1.763	3.305

TOTAL CAPABILITY: 1,014 MEGAWATTS
COAL-FIRED CAPABILITY: 1,014 MEGAWATTS
TOTAL COAL PURCHASES: 2,306,200 TONS
ILLINOIS COAL PURCHASES: 1,183,100 TONS
TOTAL GENERATION: 5.3 BILLION KILOWATTHOURS
COAL-FIRED GENERATION: 5.3 BILLION KILOWATTHOURS

ILLINOIS POWER COMPANY

Illinois Power Company (ILPWR) is an investor-owned utility involved in the generation and sale of electricity in northern, central and southern Illinois. The company's electric service territory has a population of approximately 1.5 million and includes 422 villages and cities. ILPWR serves over a half million electric customers. It also owns 20 percent of Electric Energy Incorporated. Agriculture, manufacturing and mining are the more important economic activities in its service territory. ILPWR employs about 4,000 and is headquartered in Decatur, Illinois.

Electric sales of 15.2 billion kilowatthours are valued at $800 million. Based on sales, ILPWR is the second largest Illinois electric utility and the 44th largest, nationally.

ILPWR has five coal-fired generating stations, located in northern, central and southern Illinois. These five stations have a capability of 3,157 megawatts, representing 84 percent of the company's total capability. This capability represents 21 percent of Illinois' coal-fired capability and 11 percent of statewide total capability. In 1987, ILPWR will start up a 935 megawatt nuclear station near Clinton, Illinois.

The company has 22,646 miles of above ground lines and 1,423 miles of underground lines. ILPWR has interconnections with Union Electric Company, Central Illinois Public Service Company, Commonwealth Edison Company, Iowa-Illinois Gas and Electric Company, Central Illinois Light Company, Electric Energy Incorporated, Indiana-Michigan Electric Company and the Tennessee Valley Authority.

Illinois Power Company has electric generation of about 17 billion kilowatthours. Coal-fired generation accounts for 99 percent of the total. Statewide, ILPWR accounts for 16 percent of generation.

Illinois Power's coal receipts were 7.7 million tons. Illinois coal accounts for 88 percent of this total. Statewide, ILPWR's Illinois coal demand represents 21 percent of all coal receipts and 40 percent of Illinois coal purchases. Table 5-15 details ILPWR's Illinois coal purchases since 1983. As shown in the table, Illinois Power has increased its demand for Illinois coal by about one million tons, while the delivered price has increased modestly.

TABLE 5-15. ILPWR'S ILLINOIS COAL PURCHASES, QUALITY OF COAL AND DELIVERED PRICES 1983-1986.

YEAR	1983	1984	1985	1986
THOUSAND TONS	5,853	6,702	6,143	6,847
PERCENT SULFUR	2.86	2.83	2.65	2.58
BTU/LB	10,713	10,737	10,902	10,988
$/TON	29.57	31.08	31.64	32.08
$/MMBTU	1.38	1.45	1.45	1.46

The Baldwin Station, located in southwestern Illinois at Baldwin, is the largest coal-fired station in Illinois, with capability of 1,761 megawatts. Units 1 and 2 are cyclone boilers while Unit 3 is a pulverized coal boiler. Baldwin represents 47 percent of ILPWR's total capability. Baldwin's generation of 10.3 billion kilowatthours represents 67 percent of the station's capability and 61 percent of ILPWR's total generation. The production cost per kilowatthour is 1.7 cents, ranking third in station efficiency. The fuel expense averages 1.5 cents per kilowatthour.

Almost five million tons of Illinois coal were purchased and consumed in 1986. The coal averages 10,844 BTU per pound of coal and 2.8 percent sulfur. The station has an SO2 emission rate of five pounds per million BTU of input. Nationally, Baldwin ranks seventh in tons of SO2 emissions. The station is rated modest for FGD retrofit because of age and availability of space. Illinois coal suppliers are Arch of Illinois under contract through 2008, and Peabody Coal Company and Kenellis Energy, Incorporated with contracts through April of 1999. Railroad carriers transport the coal.

The Havana Station is located on the Illinois River at Havana, in central Illinois. The one pulverized coal unit's capability is 426 megawatts and accounts for 11 percent of ILPWR's total capability. Havana's generation of 1.5 billion kilowatthours represents 39 percent of its capability and nine percent of ILPWR's total generation. It is the most costly ILPWR station to operate, with a production expense of 2.3 cents per kilowatthour. Of this total, fuel is about two cents per kilowatthour.

Havana purchased and consumed 0.7 million tons of coal in 1986. No Illinois coal is used at this station. The major Kentucky coal suppliers are ANR Coal Sales Incorporated and Blue Diamond Mining Company, both by spot market. Kessler Coal Incorporated supplies the West Virginia coal by spot market. The coal averages 12,397 BTU per pound of coal and 0.6 percent sulfur. SO2 emissions are about one pound per million BTU of input.

The Hennepin Station consists of two older pulverized coal units with capability of 298 megawatts. The station accounts for eight percent of ILPWR's total capability, and is located in northern Illinois at Hennepin. The station's generation of 1.9 billion kilowatthours represents 73 percent of its capability and 11 percent of ILPWR's total generation. It is the most efficient station to operate, with a production expense of 1.6 cents per kilowatthour. The fuel expense averages 1.4 cents per kilowatthour.

Hennepin consumed and purchased approximately 0.9 million tons of Illinois coal, averaging 10,812 BTU per pound of coal and 2.8 percent sulfur. SO2 emissions are 5.1 pounds per million BTU of input. Hennepin ranks 122nd in total SO2 emissions. Because of its age and limited space, FGD retrofit is rated difficult. Illinois coal is supplied by Amax Coal Company under contract, and Peabody Coal Company by contract through April 1999. The coal is transported by rail.

The Vermilion Station is located in east central Illinois at Oakwood. It is the smallest ILPWR station with 181 megawatts. The station's two older pulverized coal units account for five percent of system capability. The 1.2 billion kilowatthours of generation represents 79 percent of its capability and seven percent of ILPWR's total generation. Vermilion is the second most efficient plant with a production expense of 1.7 cents per kilowatthour. The fuel expense averages 1.4 cents per kilowatthour.

The 0.6 million tons of Illinois and Indiana coal receipts average 10,768 BTU per pound of coal and 2.3 percent sulfur. SO2 emissions are 4.1 pounds per million BTU of input. Vermilion ranks 155th in tons of SO2 emissions. Age and space limitations will make FGD retrofit difficult. Zeigler Coal Company supplies the Illinois coal under contract. The contract termination date is not available. Cambridge Coal Corporation supplies the Indiana coal through the spot market. The coal is shipped by rail.

The Wood River Station is located in southwestern Illinois at Wood River. The station has two pulverized coal units with 491 megawatts of capability and represents 13 percent of systemwide capability. The 1.8 billion kilowatthours of generation accounts for 11 percent of ILPWR's generation and 41 percent of station capability. Wood River ranks fourth in efficiency at 2.3 cents per kilowatthour, with fuel at 1.6 cents.

The station consumed and purchased approximately 0.7 million tons of Illinois coal. The coal averages 12,192 BTU per pound of coal and 0.9 percent sulfur. The SO2 emission rate is 1.4 pounds per million BTU of input. Consolidation Coal Company supplies the coal under contract and the coal is transported by rail. Table 5-16 provides additional statistical information on these stations and Illinois Power Company.

TABLE 5-16
ILLINOIS POWER COMPANY
COAL-FIRED GENERATING STATIONS AND STATISTICS
1986

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
BALDWIN	1	1970	587.0	CY	COAL						
	2	1973	587.0	CY	COAL						
	3	1975	587.0	PC	COAL						
TOTAL			1,761.0			10,302,356	67	194	1.72	10,860	4,743,776

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
ILLINOIS	4,586.7	10,844	2.80	10.42	31.87	1.469	5.035

TABLE 5-16 (CONTINUED)

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
HAVANA	6	1978	426.0	PC	COAL	1,458,810	39	319	2.33	11,653	691,000

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	S02 LB/MMBTU
KENTUCKY	268.9	12,633	0.64	9.12	36.15	1.431	0.988
W. VIRGINIA	418.2	12,245	0.65	10.60	34.68	1.416	1.035
TOTAL	687.1	12,397	0.64	10.02	35.26	1.422	1.007

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
HENNEPIN	1	1953	74.0	PC	COAL						
	2	1959	224.0	PC	COAL						
TOTAL			298.0			1,903,878	73	163	1.62	9,816	863,412

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	S02 LB/MMBTU
ILLINOIS	1,010.3	10,812	2.83	10.40	30.92	1.430	5.104

TABLE 5-16 (CONTINUED)

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA- BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
VERMILION	1	1955	74.0	PC	COAL						
	2	1956	107.0	PC	COAL						
TOTAL			181.0			1,248,188	79	202	1.68	10,776	630,327

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
ILLINOIS	493.2	10,833	2.51	11.66	27.24	1.258	4.518
INDIANA	135.6	10,533	1.44	12.01	24.01	1.140	2.666
TOTAL	628.8	10,768	2.28	11.74	26.55	1.233	4.129

TABLE 5-16 (CONTINUED)

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA- BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
WOOD	4	1954	101.0	PC	COAL						
RIVER	5	1964	390.0	PC	COAL						
TOTAL			491.0			1,768,061	41	158	2.32	10,355	741,098

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
ILLINOIS	756.8	12,192	0.86	5.02	38.06	1.561	1.375

TOTAL CAPABILITY: 3,740.5 MEGAWATTS
COAL-FIRED CAPABILITY: 3,157.0 MEGAWATTS
TOTAL COAL PURCHASES: 7,669,700 TONS
ILLINOIS COAL PURCHASES: 6,847,000 TONS
TOTAL GENERATION: 16.8 BILLION KILOWATTHOURS
COAL-FIRED GENERATION: 16.7 BILLION KILOWATTHOURS

SOUTHERN ILLINOIS POWER COOPERATIVE

Southern Illinois Power Cooperative (SIPCO) is an electric cooperative involved in the generation and sale of electricity in southern Illinois. Electric sales are 1.3 billion kilowatthours, with revenue of $65 million. SIPCO's electric customers consist of three member distribution cooperatives: Egyptian Electric Cooperative Association, Southeastern Illinois Electric Cooperative Incorporated and Southern Illinois Electric Cooperative. These three cooperatives supply electricity to about 37,000 customers in 19 southern Illinois counties. SIPCO also supplies electricity to other utilities on a bulk basis. Agriculture, manufacturing, mining and recreation are the more important economic activity. The Co-op employs about 100 and is located at Marion Illinois.

SIPCO has one coal-fired generating station, located in southern Illinois. The station's capability of 272 megawatts, represents less than one percent of Illinois' total capability. The Co-op's generation of 1.3 billion kilowatthours accounts for about one percent of the state's total generation.

SIPCO purchased and consumed 0.7 million tons of Illinois coal in 1986. The coal is supplied by seven coal producers. As a percent of Illinois coal used in Illinois, this figure represents four percent of the total. Table 5-17 lists SIPCO's Illinois coal purchases since 1983. As seen in the table, SIPCO is consuming approximately 0.7 million tons of coal annually, with a delivered price of less than one dollar per million BTU.

TABLE 5-17. SIPCO'S ILLINOIS COAL PURCHASES, QUALITY OF COAL AND DELIVERED PRICES 1983-1986.

YEAR	1983	1984	1985	1986
THOUSAND TONS	514	871	657	737
PERCENT SULFUR	2.78	3.12	2.94	3.20
BTU/LB	10,318	10,273	10,274	10,273
$/TON	21.42	22.49	22.93	20.25
$/MMBTU	1.04	1.09	1.12	.95

The Marion Station is located just south of Marion on Lake Egypt. The station consists of four cyclone boilers with capability of 272 megawatts. Units 1, 2 and 3 are each rated at 34 megawatts, while unit 4 is rated at 170 megawatts. Marion's generation of 1.3 billion kilowatthours is 55 percent of the station's capability. The production expense per kilowatthour is 2.2 cents, with fuel at 1.1 cents.

Marion purchased and consumed 0.7 million tons of Illinois coal and carbon in 1986. The fuel averages 10,633 BTU per pound of coal and 3.2 percent sulfur. SO2 emissions are 2.2 pounds per million BTU of input. Nationally, Marion ranks 180th in tons of SO2 emissions. Illinois coal suppliers are: J.J. Track Mining Company, Jader Fuel Company, Peabody Coal Company, Sahara coal Company, U.S. Energy Company, Williamson Coal Company and Zeigler Coal Company. The coal is transported by rail and truck.

Marion's Unit 4 utilizes a limestone FGD system rated at 161 megawatts. The capital cost of the system was $121 per kilowatt, with a removal rate of about 90 percent of the SO2 emissions. The operating expense averages about eight mills per kilowatthour. SO2 emissions at Unit 4 are about 1.1 pounds per million BTU of input, while the remaining three units average about 5.6 pounds. Overall, the station emits 2.2 pounds of SO2 per million BTU of input. Units 1 through 3 are difficult to retrofit with FGD because of space limitations. Table 5-18 provides additional data on SIPCO.

TABLE 5-18
SOUTHERN ILLINOIS POWER, COOPERATIVE
COAL-FIRED GENERATING STATION AND STATISTICS
1986

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
MARION	1	1963	34.0	CY	COAL						
	2	1963	34.0	CY	COAL						
	3	1963	34.0	CY	COAL						
	* 4	1978	170.0	CY	COAL						
TOTAL			272.0			1,306,888	55	385	2.22	10,900	723,000

* Unit 4 is equipped with FGD.

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	FGD REMOVAL (%)	SO2 LB/MMBTU
ILLINOIS	737.0	10,633	3.20	18.47	20.25	0.952	89	2.202

TOTAL CAPABILITY: 272 MEGAWATTS
COAL-FIRED CAPABILITY: 272 MEGAWATTS
TOTAL COAL PURCHASES: 737,000 TONS
ILLINOIS COAL PURCHASES: 737,000 TONS
TOTAL GENERATION: 1.3 BILLION KILOWATTHOURS
COAL-FIRED GENERATION: 1.3 BILLION KILOWATTHOURS

SPRINGFIELD CITY WATER, LIGHT AND POWER

Springfield City Water, Light and Power (CWLP) is a municipally-owned electric utility located in central Illinois. CWLP's service territory consists of the City of Springfield, with a population of about 100,000. CWLP supplies electricity to approximately 57,000 customers. Electric sales are 1.4 billion kilowatthours, with a value of $79 million. Statewide, these figures are negligible. State government is the primary economic activity in the Springfield area. CWLP is the largest municipally owned electric utility in Illinois.

CWLP has two coal-fired generating stations, located on Lake Springfield. These two stations have 443 megawatts of capability, representing 95 percent of CWLP's total capability. This figure represents three percent of Illinois' coal-fired capability and 1.5 percent of Illinois' total capability. CWLP has generation of about 1.5 billion kilowatthours. Statewide, this generation represents a little more than one percent of the total.

CWLP purchased and consumed 0.8 million tons of Illinois coal in 1986. CWLP's Illinois coal purchases represent two percent of all utility coal purchases and about five percent of Illinois coal receipts. Table 5-19 details some historical coal data for CWLP. As seen in the table, CWLP consumes about 0.8 million tons of coal annually. Since 1983, the delivered price of the coal has decreased by 12 percent.

TABLE 5-19. CWLP'S ILLINOIS COAL PURCHASES, QUALITY OF COAL AND DELIVERED PRICES 1983-1986.

YEAR	1983	1984	1985	1986
THOUSAND TONS	780	780	701	788
PERCENT SULFUR	2.80	2.80	2.88	2.89
BTU/LB	10,620	10,356	10,352	10,344
$/TON	38.54	38.90	41.41	33.95
$/MMBTU	1.82	1.88	2.00	1.64

CWLP has 600 miles of above ground lines and has electrical interconnections with Central Illinois Light Company, Central Illinois Public Service Company, Illinois Power Company and Western Illinois Power Cooperative.

The Dallman Station is located on Lake Springfield. The station consists of two cyclone units and one pulverized coal unit, with capability of 364 megawatts. The station represents 75 percent of CWLP's total capability. Dallman's generation of 1.3 billion kilowatthours is 42 percent of its capability and 90 percent of CWLP's total generation. The production expense averages 2.5 cents per kilowatthour, with fuel at 1.7 cents. The 0.7 million tons of Illinois coal bought and used averages 10,344 BTU per pound of coal and 2.9 percent sulfur. The coal is supplied by Turris Coal Company under contract, with delivery by truck.

Dallman's Unit 3 must meet the U.S. Environmental Protection Agency's New Source Performance Standard. It utilizes a limestone FGD system rated at 192 megawatts. The system came on-line in 1980 and is designed to remove up to 95 percent of the SO2 emissions. The capital cost was $194 per kilowatt. The operation and maintenance expense averages two mills per kilowatthour. The SO2 emission rate at Units 1 and 2 are 5.5 pounds per million BTU of input, while Unit 3 is about one pound. The station's average rate is 2.7 pounds per million BTU of input. Units 1 and 2 are rated difficult to retrofit with FGD because of space limitations. Nationwide, Dallman ranks 161 out of the top 200 emitting stations in tons of SO2 emissions.

The Lakeside Station is located next to the Dallman Station. The station consists of two cyclone units with 80 megawatts of capability, or 17 percent of CWLP's total capability. Lakeside's generation of 0.1 billion kilowatthours represents 18 percent of its capability and accounts for eight percent of CWLP's total generation. Lakeside's production expense averages 3.3 cents per kilowatthour. Of this total, the fuel expense averages 1.6 cents per kilowatthour.

The 78,000 tons of Illinois coal burned averages 10,343 BTU per pound of coal and 2.9 percent sulfur. The SO2 emission rate is 5.4 pounds per million BTU of input. Turris Coal Company supplies the coal under contract. The coal is transported by truck. Table 5-20 provides additional data on CWLP.

TABLE 5-20
SPRINGFIELD WATER, LIGHT AND POWER
COAL-FIRED GENERATING STATIONS AND STATISTICS
1986

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
DALLMAN	1	1968	87.5	CY	COAL						
	2	1972	86.0	CY	COAL						
	* 3	1978	190.0	PC	COAL						
TOTAL			363.5			1,347,448	42	N.A.	2.54	10,200	738,000

* Unit 3 is equipped with FGD.

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	FGD REMOVAL (%)	SO2 LB/MMBTU
ILLINOIS	710.2	10,344	2.89	9.20	34.12	1.649	90	2.721

TABLE 5-20 (CONTINUED)

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
LAKESIDE	6	1961	39.8	CY	COAL						
	7	1965	39.7	CY	COAL						
TOTAL			79.5			122,667	18	N.A.	3.34	10,200	78,000

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	S02 LB/MMBTU
ILLINOIS	77.4	10,343	2.89	9.19	32.92	1.591	5.449

TOTAL CAPABILITY: 484.1 MEGAWATTS
COAL-FIRED CAPABILITY: 443.0 MEGAWATTS
TOTAL COAL PURCHASES: 787,600 TONS
ILLINOIS COAL PURCHASES: 787,600 TONS
TOTAL GENERATION: 1.5 BILLION KILOWATTHOURS
COAL-FIRED GENERATION: 1.5 BILLION KILOWATTHOURS

CHAPTER SIX

INDIANA

Indiana electric utilities purchased approximately 37 million tons of coal; 0.3 million barrels of petroleum and 0.9 billion cubic feet of natural gas in 1986. Coal represented five percent of U.S. utility coal purchases, while petroleum and natural gas were only negligible. Indiana utilities purchased four percent of the nation's total energy. Table 6-1 lists the fossil-fuel receipts for Indiana electric utilities.

TABLE 6-1. INDIANA FOSSIL-FUEL SOURCES FOR ELECTRIC GENERATION.

FUEL	QUANTITY (000)	BTU (BILLION)	% OF TOTAL	$/UNIT	$/MMBTU
COAL	36,890 tons	787,903	99.7	33.70	1.58
PETROLEUM	335 bls.	1,935	.2	22.48	3.89
NATURAL GAS	891 mmcf.	896	.1	4.56	4.54
TOTAL		790,734	100.0		

Indiana has five investor-owned utilities, 72 municipal systems, 44 rural electric cooperatives and one state system. The major suppliers of electricity are Indiana and Michigan Electric Company, Public Service Company of Indiana, Northern Indiana Public Service Company, Hoosier Energy Rural Electric Cooperative Incorporated, Southern Indiana Gas and Electric Company, and Wabash Valley Power Association. These six utilities account for nearly 90 percent of Indiana's electrical generation.

Indiana electric utilities have 19,276 megawatts of capability. This capability consists of 18,330 megawatts of coal-fired; 662 megawatts of petroleum-fired; 210 megawatts of natural gas-fired; and 74 megawatts of hydro. Indiana's total capability represents three percent of the U.S. total. Of the 44 states that have coal-fired generation, Indiana ranks second in coal-fired capability, behind Ohio.

Table 6-2 provides a breakdown of the various fuel types by capability, number of units, percent of Indiana's total capability and percent of U.S. total capability. The U.S. total is shown as the percent of Indiana's fuel type to the U.S. total for the same fuel type. For example, the 18,330 megawatts of Indiana coal capability represents 95 percent of Indiana's total capability and six percent of the total U.S. coal-fired capability.

TABLE 6-2. INDIANA SUMMER CAPABILITY.

TYPE OF CAPABILITY	TOTAL	COAL	PETROLEUM	NATURAL GAS	WATER
MEGAWATTS	19,276	18,330	662	210	74
NO. OF UNITS	153	83	40	10	20
% OF IN TOTAL	100	95	3	1	--
% OF U.S. TOTAL	3	6	1	--	--

Indiana will add one new coal-fired unit in the near term. The unit is owned by Indiana and Michigan Electric Company, which is a subsidiary of American Electric Power Company. Table 6-3 details the Rockport station.

TABLE 6-3. FUTURE BASELOAD CAPABILITY IN INDIANA.

UTILITY	STATION AND UNIT	CAPABILITY (MW)	FUEL	ON LINE
INDIANA AND MICHIGAN ELEC.	Rockport 2	1,191	Coal	1988

Net generation by Indiana electric utilities totals 77 thousand gigawatthours, a decrease of two percent from 1985. Almost all of this generation is derived from coal. On a national basis, Indiana accounts for three percent of total generation and ranks tenth in statewide generation. Indiana utilities produce six percent of the nation's total generation. Table 6-4 details Indiana's generation by fuel type.

TABLE 6-4. INDIANA NET GENERATION.

TYPE OF CAPABILITY	TOTAL	COAL	PETROLEUM	NATURAL GAS	WATER
GIGAWATTHOURS	77,342	76,446	295	96	506
% OF IN TOTAL	100	99	--	--	1
% OF U.S. TOTAL	3	6	--	--	--

Indiana utilities purchased 37 million tons of coal in 1986. This coal is supplied by eight coal producing states. Indiana coal producers supply about 50 percent of the total. The sulfur content varies from 0.3 percent to 3.5 percent, with an overall average of 2.4 percent. The BTU content varies from 8,252 to 12,630, with a weighted average of 10,679. On a BTU cost basis, Ohio coal has the lowest delivered price at $1.16 per million BTU, while Colorado coal is the most expensive at $2.91 per million BTU. All of the low sulfur coal receipts are from the western United States. Table 6-5 lists the various coal supplying states, or regions and their respective quantities and qualities of coal sold to Indiana utilities.

TABLE 6-5. INDIANA COAL SUPPLIERS.

STATE/REGION	TONS (000)	% OF TOTAL	BTU/LB	% SULFUR	$/TON	$/MMBTU
INDIANA	17,639	48	11,048	2.80	29.66	1.34
ILLINOIS	10,214	28	10,751	2.68	35.89	1.67
WYOMING	4,069	11	8,252	.33	35.33	2.14
W. KENTUCKY	2,330	6	11,657	3.45	28.20	1.21
MONTANA	1,384	4	9,481	.43	53.93	2.84
E. KENTUCKY	616	2	12,593	1.07	53.61	2.13
COLORADO	325	1	11,461	.49	66.76	2.91
W. VIRGINIA	282	--	12,630	1.52	49.29	1.95
OHIO	31	--	11,419	3.30	26.46	1.16
TOTAL/AVERAGE	36,890	100	10,679	2.39	33.70	1.58

Illinois coal suppliers sell about ten million tons of coal to three Indiana utilities. This coal represents 28 percent of Indiana's total utility coal receipts. Public Service Company of Indiana is the largest user with 6.4 million tons. Northern Indiana Public Service receives about three million tons and Hoosier Energy Rural Electric Cooperative purchases one million tons. However, the Hoosier coal contract expires in 1987. Illinois coal sales, quality of coal and delivered prices to

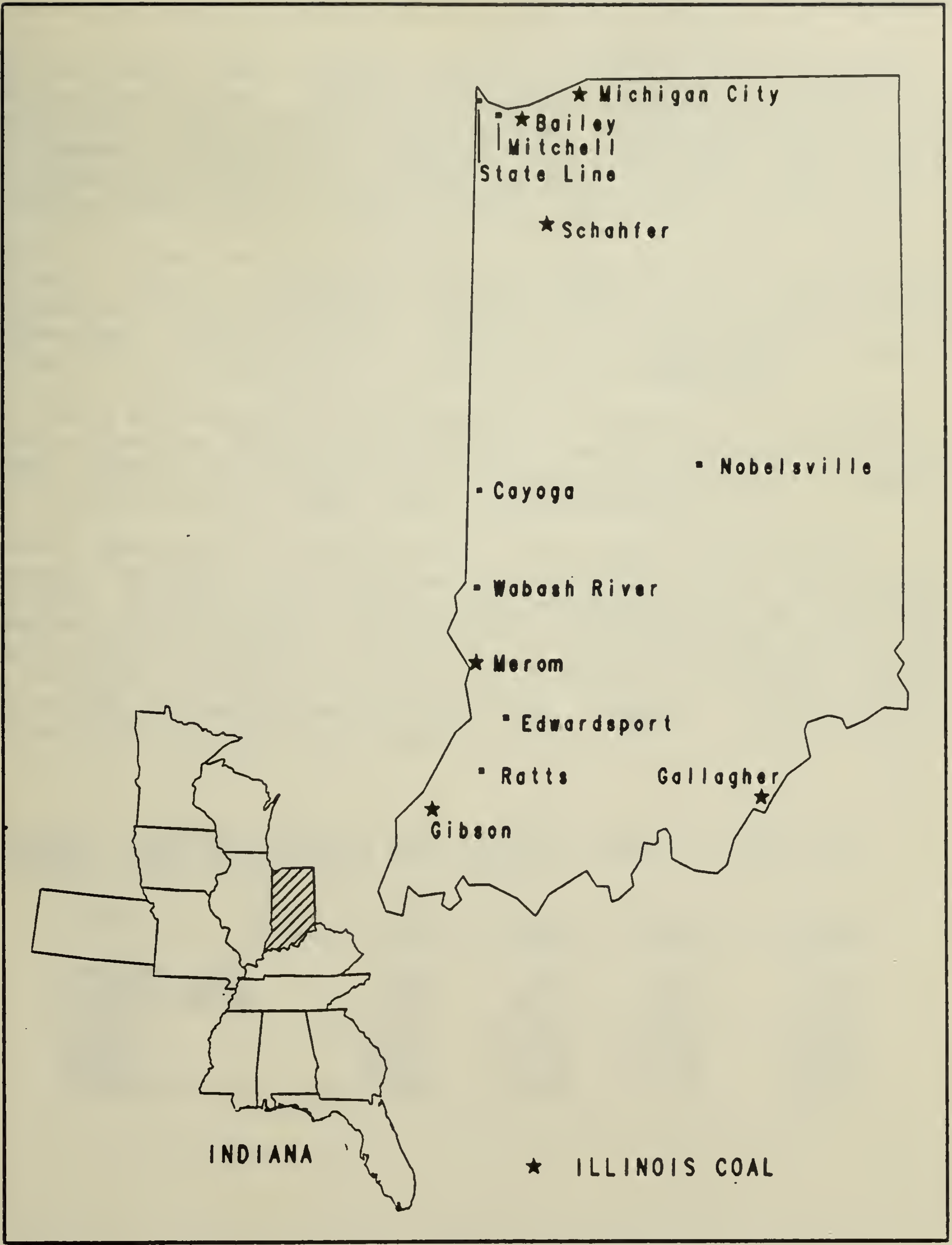
Indiana, for the period 1981 through 1986 are shown in Table 6-6. Since 1981, Indiana utilities have increased their Illinois coal receipts by five million tons.

TABLE 6-6. INDIANA'S ILLINOIS COAL PURCHASES AND DELIVERED PRICES 1986-1981.

YEAR	1981	1982	1983	1984	1985	1986
THOUSAND TONS	5,102	7,152	6,967	9,958	8,952	10,214
PERCENT SULFUR	2.60	2.50	2.50	2.70	2.60	2.68
BTU/LB	10,629	10,621	10,723	10,773	10,757	10,751
$/TON	32.04	33.83	33.54	34.80	35.39	35.89
$/MMBTU	1.51	1.59	1.56	1.62	1.65	1.67

A discussion of the three Indiana utilities that purchase Illinois coal follows. Map 6-1 shows the location of the Indiana coal-fired generating stations discussed in this chapter. For a discussion of the State Line station, see Commonwealth Edison Company in Chapter 5, Illinois.

MAP 6-1
COAL FIRED GENERATING STATIONS



HOOSIER ENERGY RURAL ELECTRIC COOPERATIVE

Hoosier Energy Rural Electric Cooperative Incorporated is located at Bloomington, Indiana. The Co-op is involved in the generation and sale of electricity in 47 southern Indiana counties. Hoosier sells electricity to 19 member cooperatives. Electric sales are about five billion kilowatthours, with a value of $200 million. Hoosier ranks fifth in statewide utility sales. The Co-op employs 455.

Hoosier has two coal-fired generating stations, located in southwestern Indiana. These stations have a total capability of 1,154 megawatts, representing six percent of Indiana's coal-fired capability. The cooperative generates about five billion kilowatthours, annually. Statewide, this accounts for six percent of total generation.

The Co-op has electrical interconnections with Public Service Company of Indiana, Southern Indiana Gas and Electric Company, Indianapolis Power and Light Company and Big Rivers Rural Electric Cooperative. Information concerning the miles of power lines is not available.

Hoosier purchased 2.4 million tons of coal in 1986. One Illinois coal operator supplies one million tons, or 42 percent of its coal demand. Hoosier's Illinois coal receipts represent three percent of total coal purchases and ten percent of Illinois coal purchases by Indiana utilities. Table 6-7 details Hoosier's Illinois coal purchases since 1983. As shown in the table, Hoosier has increased its Illinois coal receipts from 0.4 million tons to one million tons since 1983. However, the contract for Illinois coal is terminated in 1987.

TABLE 6-7. HOOSIER'S ILLINOIS COAL PURCHASES, QUALITY OF COAL AND DELIVERED PRICES 1983-1986.

YEAR	1983	1984	1985	1986
THOUSAND TONS	393	561	967	1,002
PERCENT SULFUR	2.91	2.91	3.04	3.19
BTU/LB	11,117	11,033	10,761	10,584
$/TON	39.37	41.36	43.64	43.08
$/MMBTU	1.77	1.87	2.03	2.04

The Merom Station is located in southwestern Indiana at Sullivan. The station consists of two new pulverized coal boilers with capability of 920 megawatts. The station represents 80 percent of Hoosier's total capability. Merom's generation of 3.5 billion kilowatthours represents 56 percent of the station's capability and 73 percent of Hoosier's total generation. No figure is available concerning the cost per kilowatthour of generation.

The station purchased and used approximately 1.8 million tons of Illinois and Indiana coal in 1986. The coal averages 10,827 BTU per pound of coal and 3.4 percent sulfur. Freeman United Coal Mining Company supplies the Illinois coal under contract, with transportation by rail. The contract terminates in 1987. Amax Coal Company and Solar Sources, Incorporated are the major Indiana coal suppliers, by spot market.

Merom utilizes two limestone FGD systems rated at 460 megawatts, each. These systems remove up to 90 percent of the SO2 emissions, with an emission rate of 1.2 pounds per million BTU of input. No figures are available concerning the capital cost and operating expense of the FGD system.

The Ratts Station is located in southwestern Indiana at Petersburg, on the White River. The station consists of two pulverized coal units with a capability of 234 megawatts. Units 1 and 2 are each rated at 117 megawatts. The station represents 20 percent of Hoosier's total capability. Ratts' generation of 1.2 billion kilowatthours represents 60 percent of the station's capability and 26 percent of Hoosier's total generation. No figure is available on the cost per kilowatthour of generation.

Ratts' received and consumed approximately 0.6 million tons of Indiana coal in 1986. The Indiana coal reserves are owned by Hoosier and operated by an independent coal producer. The coal averages 11,098 BTU per pound of coal and 2.7 percent sulfur. SO2 emissions are 4.8 pounds per million BTU of input. The station ranks 94th in total tons of SO2 emissions. Ratts' is rated as modest to be retrofitted with FGD because of age and availability of space. Table 6-8 provides additional data on the two generating stations and Hoosier sytemwide data.

TABLE 6-8
HOOSIER ENERGY RURAL ELECTRIC COOPERATIVE
COAL-FIRED GENERATING STATIONS AND STATISTICS
1986

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
MEROM	* 1	1983	460.0	PC	COAL						
	* 2	1982	460.0	PC	COAL						
TOTAL			920.0			3,528,732	44	N.A.	N.A.	10,400	1,857,000

* Units 1 and 2 are equipped with FGD.

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	FGD REMOVAL (%)	SO2 LB/MMBTU
ILLINOIS	** 1,001.9	10,584	3.19	9.29	43.08	2.035		5.877
INDIANA	782.6	11,137	3.68	10.88	29.12	1.307		6.443
TOTAL	1,784.5	10,827	3.40	9.99	36.96	1.707	90	1.200

** The Illinois coal contract expires in 1987.

TABLE 6-8 (CONTINUED)

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
RATTS	1	1970	117.0	PC	COAL						
	2	1970	117.0	PC	COAL						
TOTAL			234.0			1,238,433	60	N.A.	N.A.	10,180	568,000

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
INDIANA	572.9	11,098	2.72	9.26	29.69	1.338	4.779

TOTAL CAPABILITY: 1,154 MEGAWATTS
COAL-FIRED CAPABILITY: 1,154 MEGAWATTS
TOTAL COAL PURCHASES: 2,357,400 TONS
ILLINOIS COAL PURCHASES: 1,001,900 TONS
TOTAL GENERATION: 4.8 BILLION KILOWATTHOURS
COAL-FIRED GENERATION: 4.8 BILLION KILOWATTHOURS

NORTHERN INDIANA PUBLIC SERVICE COMPANY

Northern Indiana Public Service Company (NIPSCO), headquartered in Hammond, Indiana, is a combination public utility involved in the generation, purchase and distribution of electricity, and sale of natural gas. It sells electricity to more than 233 communities with a population of 2.2 million in northern Indiana. NIPSCO supplies electricity to approximately 364 thousand customers, in 30 counties. The company employs 5,800.

Electric sales are approximately 11 billion kilowatthours, with revenue of $900 million. Total kilowatthours sold ranks NIPSCO as the third largest Indiana electric utility. Nationally, NIPSCO ranks 55th among electric utilities in kilowatthour sales.

NIPSCO has four coal-fired generating stations, located in northwestern Indiana. These stations have a capability of 3,196 megawatts, or 94 percent of NIPSCO's total capability. The remainder of capability consists of oil and hydro units. The coal-fired capability represents 17 percent of the state's total capability.

NIPSCO has 10,588 miles of above ground lines and 658 miles of underground lines. The company has electrical interconnections with Indiana-Michigan Electric Company, Commonwealth Edison Company, Public Service Company of Indiana and Consumers Power Company.

NIPSCO's electrical generation is about 8.3 billion kilowatthours, with coal accounting for 96 percent of the total. Statewide, this generation represents 11 percent of total generation.

NIPSCO purchased 3.6 million tons of coal in 1986. Illinois coal operators supply 2.8 million tons, or 78 percent of the total. The Schahfer station receives about 46 percent of the Illinois coal. NIPSCO's Illinois coal receipts represent eight percent of all utility coal purchases in Indiana and accounts for 28 percent of Illinois coal purchases statewide. Since 1983, NIPSCO has increased its demand for Illinois coal by 40 percent, while the delivered price has stayed relatively the same. Table 6-9 shows NIPSCO's Illinois coal purchases for the past four years.

TABLE 6-9. NIPSCO'S ILLINOIS COAL PURCHASES, QUALITY OF COAL AND DELIVERED PRICES 1983-1986.

YEAR	1983	1984	1985	1986
THOUSAND TONS	1,964	3,245	2,141	2,768
PERCENT SULFUR	2.93	3.07	3.00	3.12
BTU/LB	10,760	10,905	10,955	10,983
$/TON	40.49	41.75	42.71	40.63
$/MMBTU	1.88	1.91	1.95	1.85

The following paragraphs discuss NIPSCO's four coal-fired stations. Table 6-10, at the end of the narrative, provides additional statistics on these stations and NIPSCO. Refer to Map 6-1 for the locations of these stations.

The Bailly Station is located in northwestern Indiana at Dune Acres. The station consists of two cyclone units with capability of 480 megawatts. This represents 14 percent of the company's total capability. It is the smallest coal-fired station owned by NIPSCO. Bailly's generation of 1.7 billion kilowatthours represents 40 percent of its capability and 20 percent of NIPSCO's total generation. The production expense is three cents per kilowatthour, with the fuel expense at two cents. Bailly is the second most efficient station.

Bailly purchased and consumed 0.8 million tons of coal in 1986. This coal averages 11,361 BTU per pound of coal and 2.9 percent sulfur. SO2 emissions are about five pounds per million BTU of input. The station ranks 98th nationally in tons of SO2 emissions. Installation of an FGD system is rated difficult because of space limitation. The coal is supplied by three states. The Illinois coal suppliers are Arch of Illinois under contract (May 1998) and Zeigler Coal Company by contract (March 1989). Spot market purchases were with Consolidation Coal Company, Freeman United Coal Mining Company and Old Ben Coal Company. The coal is transported by rail and barge. The Indiana coal is supplied by Amax Coal Company, by spot market. The supplier of the West Virginia coal is not available.

The Michigan City Station is located in northwestern Indiana at Michigan City. It consists of three cyclone units with capability of 589 megawatts. Michigan City is the second largest station in NIPSCO's system and accounts for 17 percent of NIPSCO's total generation. The station's generation of 2.3 billion kilowatthours accounts for 44 percent of its capability and 28 percent of NIPSCO's total generation. It is the most efficient NIPSCO station at 2.9 cents per kilowatthour of generation. The fuel expense is 2.3 cents per kilowatthour.

The 1.1 million tons of coal purchased and used at the Michigan City Station averages 11,080 BTU per pound of coal and 2.9 percent sulfur. Emissions of SO2 are five pounds per million BTU of input. Nationally, the station ranks 63rd in total tons of SO2 emissions. Because of its size and limited space, the station has a difficult retrofit FGD cost factor of 1.6 to 1.9 times the cost of an FGD system on a new coal-fired station. One Illinois coal producer, Zeigler Coal Company supplies 82 percent of the station's coal. Zeigler is under contract through March 1989. The coal is transported by rail and barge. Amax Coal Company of Indiana supplies the balance through spot market sales.

The **Mitchell Station** is located in northwestern Indiana at Gary. The station has four pulverized coal units with capability of 485 megawatts, or 24 percent of NIPSCO's total capability. The station's generation of 0.7 billion kilowatthours represents 17 percent of its capability and eight percent of the company's total generation. Mitchell is the least efficient NIPSCO station, primarily because of the high cost of the low sulfur coal. The production expense averages 5.6 cents per kilowatthour, with the fuel expense at 3.8 cents.

The 0.4 million tons of coal burned averages 11,110 BTU per pound of coal and 0.5 percent sulfur. Mitchell's SO2 emissions are 0.9 pound per million BTU of input. Information is not available on the FGD retrofit difficulty for this station. The supplier of the Wyoming coal is not available.

The Schahfer Station is located in northwestern Indiana at Wheatfield, on the Kankakee River. It consists of three new pulverized coal units and one cyclone unit, with capability of 1,642 megawatts. It is the largest NIPSCO station with 48 percent of the company's total capability. The station's generation of 3.4 billion kilowatthours accounts for 23 percent of its capability and 41 percent of NIPSCO's total generation. It is NIPSCO's third most efficient plant. The production expense per kilowatthour is 3.4 cents, with the fuel expense at 2.4 cents.

The 1.8 million tons of coal purchased and used averages 11,043 BTU per pound of coal and 2.5 percent sulfur. Coal supplying states are Colorado, Wyoming and Illinois. The Illinois coal is supplied by Arch of Illinois under contract through May 1998. The coal is transported by rail. The Wyoming coal is supplied by Carbon County Coal Company (spot market), while the Colorado coal is supplied by Colorado Westmoreland Incorporated (contract through 1993).

Schahfer's Units 17 and 18 were the first in the United States required to meet the U.S. Environmental Protection Agency's Revised New Source Performance Standard of 1979. Both units utilize dual alkali FGD systems with 90 percent SO2 removal. No capital costs are available, but the operation and maintenace expense averages four mills per kilowatthour. Overall, the station has an SO2 emission rate of 0.8 pound per million BTU of input.

TABLE 6-10
NORTHERN INDIANA PUBLIC SERVICE COMPANY
COAL-FIRED GENERATING STATIONS AND STATISTICS
1986

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
BAILLY	7	1962	160.0	CY	COAL						
	8	1968	320.0	CY	COAL						
TOTAL			480.0			1,669,074	40	304	3.13	10,629	783,000

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
ILLINOIS	677.2	11,096	3.00	9.67	38.18	1.720	5.272
INDIANA	46.7	11,074	2.45	9.37	33.39	1.508	4.314
W. VIRGINIA	101.7	13,258	2.45	7.16	43.04	1.623	3.603
TOTAL	825.6	11,361	2.90	9.34	38.51	1.695	4.978

TABLE 6-10 (CONTINUED)

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
MICHIGAN	12	1974	469.0	CY	COAL						
CITY	2	1950	60.0	CY	COAL						
	3	1951	60.0	CY	COAL						
TOTAL			589.0			2,266,182	44	284	2.89	10,862	1,131,000

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
ILLINOIS	748.9	11,023	3.04	9.80	44.02	1.997	5.378
INDIANA	142.0	10,998	1.96	9.11	32.42	1.474	3.475
W. VIRGINIA	28.0	13,017	2.41	8.17	43.01	1.652	3.610
TOTAL	918.9	11,080	2.85	9.64	42.19	1.904	5.016

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
MITCHELL	11	1970	110.0	PC	COAL						
	4	1956	125.0	PC	COAL						
	5	1959	125.0	PC	COAL						
	6	1959	125.0	PC	COAL						
TOTAL			485.0			725,352	17	227	5.62	11,053	392,000

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
WYOMING	350.0	11,110	0.53	5.72	70.60	3.177	0.930

TABLE 6-10 (CONTINUED)

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
SCHAHFER	14	1976	431.0	CY	COAL						
	15	1979	472.0	PC	COAL						
	* 17	1982	344.0	PC	COAL						
	* 18	1985	395.0	PC	COAL						
TOTAL			1,642.0			3,379,610	23	738	3.44	11,313	1,751,000

* Units 17 and 18 are equipped with FGD.

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	FGD REMOVAL (%)	SO2 LB/MMBTU
COLORADO	325.3	11,461	0.49	9.65	66.76	2.913		0.834
ILLINOIS	1,342.1	10,904	3.23	10.56	40.00	1.834		5.776
WYOMING	202.2	11,297	0.55	7.95	60.52	2.678		0.949
TOTAL	1,869.6	11,043	2.46	10.12	46.88	2.122	90	0.750

TOTAL CAPABILITY:	3,386 MEGAWATTS
COAL-FIRED CAPABILITY:	3,196 MEGAWATTS
TOTAL COAL PURCHASES:	3,614,100 TONS
ILLINOIS COAL PURCHASES:	2,768,200 TONS
TOTAL GENERATION:	8.3 BILLION KILOWATTHOURS
COAL-FIRED GENERATION:	8.0 BILLION KILOWATTHOURS

PUBLIC SERVICE COMPANY OF INDIANA

Public Service Company of Indiana (PSIND), headquartered in Plainfield, Indiana, is engaged in the production, transmission, distribution and sale of electricity to more than 700 cities, towns and unincorporated communities in northcentral, central and southern Indiana. The company's service area includes 69 of the 92 Indiana counties. PSIND serves about 0.6 million electric customers. It also wholesales electricity to 43 municipalities and 16 rural electric cooperatives. The economic base of its service area consists of agriculture and diversified industry. PSIND employs about 3,000.

Electric sales are approximately 18 billion kilowatthours, with a value of one billion dollars. Total kilowatthours sold ranks PSIND as the largest Indiana electric utility and the 35th largest, nationally.

PSIND has six coal-fired generating stations, located throughout central and southern Indiana. The capability of these stations total 5,249 megawatts, or 95 percent of PSIND's available capability. The remainder consists of oil and hydro units. The coal-fired capability further represents 27 percent of the state's total capability.

Public Service Company of Indiana has 23,511 miles of above ground lines and 2,203 miles of underground lines. The company has electrical interconnections with Indianapolis Power and Light, Kentucky Utilities Company, Northern Indiana Public Service Company, Louisville Gas and Electric Company, Cincinnati Gas and Electric Company, Indiana and Michigan Electric Company, Southern Indiana Gas and Electric Company, Central Illinois Public Service Company, East Kentucky Rural Electric Cooperative and the Indiana Association of Rural Electric Cooperatives.

PSIND has generation of about 25 billion kilowatthours, with coal accounting for 98 percent of the total. Statewide, this represents 32 percent of total generation.

Public Service Company of Indiana purchased 11.2 million tons of coal in 1986. PSIND is the 12th largest user of coal in the United States. Illinois coal producers supply 6.4 million tons, or 57 percent of its total coal demand. The Gibson station uses 97 percent of the Illinois coal. PSIND is the third largest consumer of Illinois coal. Since 1983, the company has increased its demand for Illinois coal by 40 percent, while the delivered price has only increased by ten percent. Table 6-11 shows PSIND's Illinois coal purchases since 1983.

TABLE 6-11. PSIND'S ILLINOIS COAL PURCHASES, QUALITY OF COAL AND DELIVERED PRICES 1983-1986.

YEAR	1983	1984	1985	1986
THOUSAND TONS	4,610	6,027	5,748	6,444
PERCENT SULFUR	2.31	2.42	2.32	2.40
BTU/LB	10,674	10,645	10,630	10,640
$/TON	30.10	30.62	31.36	32.72
$/MMBTU	1.41	1.44	1.48	1.54

The following paragraphs discuss the six coal-fired stations operated by PSIND. Table 6-12 at the end of this narrative provides additional data on these stations. Refer to Map 6-1 for the locations of these stations.

The Cayuga Station is located in west central Indiana at Cayuga, near the Vermilion River. The station consists of two pulverized coal units with capability of 985 megawatts, which represents 18 percent of the company's total capability. It is the second largest coal-fired station owned by PSIND. Cayuga's generation of 5.3 billion kilowatthours represents 62 percent of the station's capability and 22 percent of PSIND's total generation. It is PSIND' most efficient station with a production expense of 1.6 cents per kilowatthour, with the fuel expense at 1.4 cents.

Cayuga purchased and consumed about 2.6 million tons of Indiana coal in 1986. The coal averages 10,414 BTU per pound of coal and 2.4 percent sulfur. SO2 emissions are 4.5 pounds per million BTU of input. Nationally, it ranks 38th in tons of SO2 emissions. Installation of an FGD system is rated modest because of the age of the station and availability of space. The Indiana coal is supplied by Peabody Coal Company under contract through 1993.

The Edwardsport Station is located in southwestern Indiana at Edwardsport. It consists of two relatively old pulverized coal units with capability of 120 megawatts. Edwardsport is the second smallest station in PSIND's system, with two percent of capability. The station's generation of 46 million kilowatthours represents four percent of its capability. No figures are available on the cost per kilowatthour of generation.

The 36,000 tons of Indiana coal used averages 10,939 BTU per pound of coal and 2.5 percent sulfur. Edwardsport's SO2 emission rate is 4.5 pounds per million BTU of input. No information is available on the FGD cost factor. J and R Coal Company supplies the Indiana coal under contract.

The Gallagher Station is located in southeastern Indiana at New Albany. The station has four older pulverized coal units with capability of 560 megawatts, representing ten percent of PSIND's total capability. The station's generation of 1.4 billion kilowatthours represents 29 percent of its capability and eight percent of the company's total generation. Gallagher is the third most efficient PSIND station. The production expense averages 2.4 cents per kilowatthour, with the fuel expense at 1.4 cents.

The 0.7 million tons of coal purchased and consumed averages 11,410 BTU per pound of coal and 3.1 percent sulfur. The emission rate for SO2 is 5.3 pounds per million BTU of input. Nationally, the station ranks 85th in tons of SO2 emissions. The station is rated difficult to retrofit with FGD because of the age of the station and limited space. The three coal supplying states are Indiana, Kentucky and Illinois. The Illinois coal is supplied by Amax Coal Company under contract (August 1993) and Tek Bar Industries by spot market. The coal is transported by rail and barge. The Indiana coal is purchased from Amax Coal Company by contract through August 1993, while the Kentucky coal is received from Kentucky Pyro Mining Company by spot market.

The **Gibson Station** is located in southwestern Indiana near Princeton. It consists of five newer pulverized coal units with capability of 3,140 megawatts. Gibson is the largest PSIND station and one of the largest stations in the nation. Unit 5 is jointly owned with Small Municipal and Cooperative Incorporated. The station's generation of 16 billion kilowatthours accounts for 58 percent of its capability and 65 percent of PSIND's total generation. It is PSIND's second most efficient plant. The production expense per kilowatthour is 1.8 cents, with the fuel expense at 1.6 cents.

The 7.4 million tons of coal used averages 10,727 BTU per pound of coal and 2.4 percent sulfur. Illinois coal producers supply 89 percent of the station's coal needs, with the balance from Indiana. The Illinois coal is supplied by Amax Coal Company and Monterey Coal Company, under contract. Both contracts will expire at the end of 2002. The coal is transported by rail. The Indiana coal is supplied by Old Ben Coal Company by contract through September 1990.

Gibson's unit 5 is equipped with a limestone FGD system. The system was started in 1982 and is capable of removing 86 percent of the SO2 emissions. No capital cost, or operation and maintenance expenses are available. The station's overall SO2 emission rate is 3.8 pounds per million BTU of input, with Unit 5 at 1.2 pounds. Nationally, Gibson ranks fourth in tons of SO2 emissions. Units 1 through 4 are rated as easy to retrofit with FGD because of the age of the station, unit size and availability of space.

The **Noblesville Station** is located in central Indiana at Noblesville. The station has two older pulverized coal units with capability of 90 megawatts. The station's generation of 5.5 million kilowatthours represents one percent of its capability and accounts for only a negligible percent of the company's total generation. No cost figures are available on the station. The 6,000 tons of coal burned averages 10,940 BTU per pound of coal and 4.1 percent sulfur. SO2 emissions are 7.3 pounds per million BTU of input. The Indiana coal is purchased from the Whole Nine Yards Coal Company, by spot market.

The Wabash River Station is located in west central Indiana at Terre Haute. Wabash River has six older pulverized coal units with capability of 753 megawatts, representing 14 percent of PSIND's total capability. The station's generation of 1.3 billion kilowatthours represents 20 percent of its capability and five percent of the company's generation. Wabash River's production expense is 2.6 cents per kilowatthour, with the fuel expense at 1.8 cents. Of the PSIND stations with cost figures, Wabash River is the least efficient.

The 0.7 million tons of Indiana coal purchased and consumed in 1986 averages 10,937 BTU per pound of coal and 2.1 percent sulfur. SO2 emissions are 3.8 pounds per million BTU of input. Nationally, the station ranks 78th in tons of SO2 emissions. Retrofitting with an FGD system is rated difficult because of age, size and limited space. The major Indiana coal suppliers are Peabody Coal Company and Amax Coal Company, both by contract.

TABLE 6-12
PUBLIC SERVICE COMPANY OF INDIANA
COAL-FIRED GENERATING STATIONS AND STATISTICS
1986

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
CAYUGA	1	1970	500.0	PC	COAL						
	2	1972	485.0	PC	COAL						
TOTAL			985.0			5,328,203	62	159	1.58	10,008	2,643,000

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
INDIANA	2,442.8	10,414	2.42	12.36	27.91	1.340	4.531

TABLE 6-12 (CONTINUED)

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPABILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
EDWARDS-	7	1948	45.0	PC	COAL						
PORT	8	1951	75.0	PC	COAL						
TOTAL			120.0			46,258	4	N.A.	N.A.	17,026	36,000

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
INDIANA	30.9	10,939	2.53	9.50	26.57	1.214	4.510

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPABILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
GALLAGHER	1	1959	140.0	PC	COAL						
	2	1958	140.0	PC	COAL						
	3	1960	140.0	PC	COAL						
	4	1961	140.0	PC	COAL						
TOTAL			560.0			1,413,290	29	162	2.36	10,856	679,000

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
ILLINOIS	212.7	11,921	2.89	10.78	32.88	1.379	4.727
INDIANA	474.6	11,024	3.09	9.23	31.93	1.448	5.466
KENTUCKY	92.9	12,212	3.48	11.94	31.60	1.294	5.557
TOTAL	780.2	11,410	3.08	9.97	32.15	1.409	5.264

TABLE 6-12 (CONTINUED)

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
GIBSON	1	1976	630.0	PC	COAL						
	2	1975	630.0	PC	COAL						
	3	1977	630.0	PC	COAL						
	4	1978	630.0	PC	COAL						
	* 5	1982	620.0	PC	COAL						
TOTAL			3,140.0			16,006,830	58	291	1.81	9,862	7,402,000

* Company owns 50.1% of Unit 5 and the Unit is equipped with FGD.

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	FGD REMOVAL (%)	S02 LB/MMBTU
ILLINOIS	6,230.8	10,635	2.39	10.60	32.70	1.538		4.382
INDIANA	775.8	11,461	2.68	7.66	35.82	1.563		4.560
TOTAL	7,006.6	10,727	2.42	10.27	33.07	1.541	86	1.200

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
NOBLES-VILLE	1	1950	45.0	PC	COAL						
	2	1950	45.0	PC	COAL						
TOTAL			90.0			5,517	1	N.A.	N.A.	N.A.	6,000

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	S02 LB/MMBTU
INDIANA	4.9	10,940	4.09	12.70	28.55	1.305	7.290

TABLE 6-12 (CONTINUED)

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
WABASH	1	1953	85.0	PC	COAL						
RIVER	2	1953	85.0	PC	COAL						
	3	1954	85.0	PC	COAL						
	4	1954	85.0	PC	COAL						
	5	1956	95.0	PC	COAL						
	6	1968	318.0	PC	COAL						
TOTAL			753.0			1,348,626	20	163	2.63	11,105	714,000

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
INDIANA	884.8	10,937	2.13	10.32	30.27	1.384	3.798

TOTAL CAPABILITY: 5,544 MEGAWATTS
COAL-FIRED CAPABILITY: 5,249 MEGAWATTS
TOTAL COAL PURCHASES: 11,150,200 TONS
ILLINOIS COAL PURCHASES: 6,443,500 TONS
TOTAL GENERATION: 24.6 BILLION KILOWATTHOURS
COAL-FIRED GENERATION: 24.1 BILLION KILOWATTHOURS

CHAPTER SEVEN

IOWA

Iowa electric utilities purchased approximately 11 million tons of coal; 0.1 million barrels of petroleum; and one billion cubic feet of natural gas in 1986. The coal received by Iowa electric utilities represented two percent of total U.S. coal receipts, while the petroleum and natural gas receipts were only negligible. On a BTU basis, Iowa utilities purchased one percent of the U.S. total. Table 7-1 lists the fossil-fuel sources used by Iowa utilities for electrical generation.

TABLE 7-1. IOWA FOSSIL-FUEL SOURCES FOR ELECTRIC GENERATION.

FUEL	QUANTITY (000)	BTU (BILLION)	% OF TOTAL	$/UNIT	$/MMBTU
COAL	11,384 tons	209,150	99.2	25.20	1.37
PETROLEUM	60 bls.	347	.2	21.11	3.63
NATURAL GAS	1,241 mmcf.	1,262	.6	3.48	3.42
TOTAL		210,759	100.0		

Iowa has eight investor-owned utilities, 138 municipal systems, 51 rural electric cooperatives and four state systems. The major suppliers of electricity are Iowa-Illinois Gas and Electric Company, Iowa Power and Light Company, Iowa Electric Light and Power Company, Interstate Power Company and Iowa Public Service Company. Other large suppliers are Iowa Southern Utilities Company, Muscatine Power and Water Department and Central Iowa Power Cooperative. These eight utilities account for almost all of Iowa's electrical generation.

Iowa electric utilities have 7,851 megawatts of capability, consisting of 6,007 megawatts of coal-fired capability; 617 megawatts of natural gas-fired; 582 megawatts of petroleum-fired; 500 megawatts of nuclear-fired; 124 megawatts of water; and 21 megawatts of other. Iowa's total capability accounts for one percent of the U.S. total capability. Of the 44 states that have coal-fired generation, Iowa ranks 16th. Table 7-2 provides a breakdown of Iowa's capability. For example, the 6,007 megawatts of Iowa coal capability represents two percent of the U.S. coal-fired capability. Iowa utilities have no plans of adding new coal-fired capability in the near-to-long term.

TABLE 7-2. IOWA SUMMER CAPABILITY.

TYPE OF CAPABILITY	TOTAL	COAL	NUCLEAR	PETROLEUM	NATURAL GAS	WATER	OTHER
MEGAWATTS	7,851	6,007	500	582	617	124	21
NO. OF UNITS	423	57	1	285	53	24	3
% OF IA TOTAL	100	77	6	7	8	2	--
% OF U.S. TOTAL	1	2	1	1	1	--	--

Net generation by Iowa electric utilities totals 24 thousand gigawatthours, a small increase from 1985. By energy source, coal supplies 82 percent of the total; nuclear 12 percent; and water four percent. On a national basis, Iowa ranks 34th among the states in generation, with one percent of total generation. For the U.S. total, coal and nuclear generates one percent, each. Table 7-3 details each category by type of generation.

TABLE 7-3. IOWA NET GENERATION.

TYPE OF CAPABILITY	TOTAL	COAL	NUCLEAR	PETROLEUM	NATURAL GAS	WATER	OTHER
GIGAWATTHOURS	24,137	19,993	2,993	42	87	952	70
% OF IA TOTAL	100	82	12	--	--	4	--
% OF U.S. TOTAL	1	1	1	--	--	--	1

In 1986, Iowa utilities purchased approximately 11 million tons of coal. This coal is supplied by six coal producing states. The sulfur content varies from 0.4 percent to 2.9 percent, with a weighted average of 0.9 percent. The BTU content varies from 8,604 to 11,257 per pound of coal, with an average of 9,186. On a BTU cost basis, western Kentucky coal has the lowest delivered price at $1.03 per million BTU, while Illinois coal is the most expensive at $1.56 per million BTU. Table 7-4 lists the coal supplying states, or region, and their respective quantities and qualities sold to Iowa.

TABLE 7-4. IOWA COAL SUPPLIERS.

STATE/REGION	TONS (000)	% OF TOTAL	BTU/LB	% SULFUR	$/TON	$/MMBTU
WYOMING	8,754	77	8,604	.40	22.88	1.33
ILLINOIS	1,971	17	11,257	2.72	32.51	1.56
INDIANA	417	4	10,877	2.48	24.11	1.11
IOWA	146	1	9,968	2.23	29.89	1.50
MISSOURI	80	1	11,181	2.55	30.45	1.36
W. KENTUCKY	17	--	11,160	2.93	22.97	1.03
TOTAL/AVERAGE	11,384	100	9,186	.92	25.20	1.37

Illinois coal suppliers sold about two million tons of coal to six Iowa utilities in 1986. These coal sales represent 17 percent of Iowa's total utility coal purchases. The major coal supplying state is Wyoming with 77 percent of the total. Interstate Power Company purchased 0.6 million tons of Illinois coal, followed by Iowa Electric Light and Power Company at 0.5 million tons; Muscatine Power and Water Department with 0.5 million tons; Iowa-Illinois Gas and Electric Company with 0.3 million tons; Eastern Iowa Light and Power Company with 0.1 million tons; and Iowa Southern Utilities Company with 20,000 tons. Illinois coal sales, quality of coal and delivered prices to Iowa, for the period 1981 through 1986 are shown in Table 7-5. Since 1981, Iowa utilities have increased their demand for Illinois coal by 62 percent, while the delivered price has decreased by 15 percent.

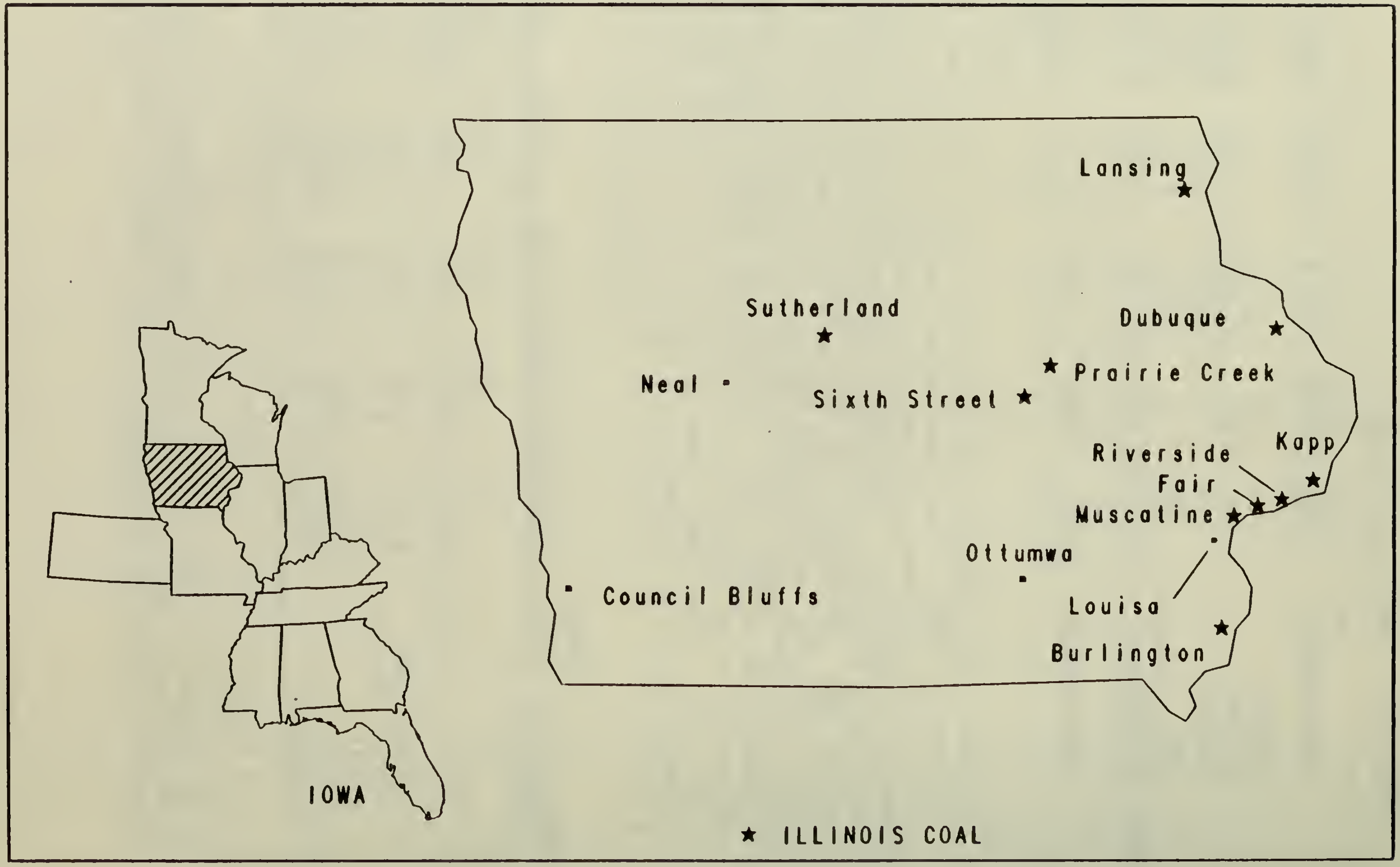
TABLE 7-5. IOWA'S ILLINOIS COAL PURCHASES AND DELIVERED PRICES 1981-1986.

YEAR	1981	1982	1983	1984	1985	1986
THOUSAND TONS	1,213	1,537	1,654	1,168	2,035	1,971
PERCENT SULFUR	2.60	2.90	3.00	2.90	2.80	2.72
BTU/LB	10,925	11,083	11,173	11,018	11,267	11,257
$/TON	40.31	36.03	37.92	37.05	35.87	35.21
$/MMBTU	1.84	1.63	1.70	1.68	1.59	1.56

A discussion of the six Iowa utilities that purchased Illinois coal in 1986 follows. Map 7-1 shows the locations of the coal-fired generating stations discussed in this chapter.

MAP 7-1

COAL FIRED GENERATING STATIONS



EASTERN IOWA LIGHT AND POWER COOPERATIVE

Eastern Iowa Light and Power Cooperative provides electrical service to about 19,000 customers in eastern Iowa. Its annual sales are approximately 0.3 billion kilowatthours, with a value of $21 million. The cooperative is headquartered in Wilton, Iowa.

The co-op owns one coal-fired generating station with 65 megawatts of capability. The station is operated by Central Iowa Power Cooperative. This capability represents one percent of Iowa's coal-fired capability. The co-op's generation of 0.3 billion kilowatthours represents one percent of Iowa's total generation.

Eastern Iowa Light and Power Cooperative purchased 124,000 tons of coal in 1986. Illinois coal producers supply 100 thousand tons, or 81 percent of the station's total coal demand. The Illinois coal receipts represent one percent of Iowa's total utility coal demand and five percent of the state's Illinois coal receipts. Table 7-6 details the co-op's Illinois coal purchases for the past four years. As seen in the table, the co-op's Illinois coal receipts have increased by about 35 percent, while the delivered price has fallen by 23 percent.

TABLE 7-6. EASTERN IOWA CO-OP'S ILLINOIS COAL PURCHASES, QUALITY OF COAL AND DELIVERED PRICES 1983-1986.

YEAR	1983	1984	1985	1986
THOUSAND TONS	68	96	75	97
PERCENT SULFUR	2.96	2.88	2.74	2.59
BTU/LB	11,119	11,477	11,675	11,554
$/TON	35.34	28.95	30.07	28.09
$/MMBTU	1.59	1.26	1.29	1.22

Below is a description of the co-op's one coal-fired station. Table 7-7 provides additional data on the station. For the location of the station refer to Map 7-1.

The Fair Station has two pulverized coal units with capability of 65 megawatts. The station's generation of 0.3 billion kilowatthours represents 46 percent of its capability. This generation represents one percent of Iowa's total generation. Production costs are not available, but the fuel expense averages 1.4 cents per kilowatthour.

The station used 138 thousand tons of Illinois, Indiana and Kentucky coal in 1986. The coal averages 11,464 BTU per pound of coal and 2.6 percent sulfur. The SO2 emission rate is 4.5 pounds per million BTU of input. Because the station is small, no information is available concerning the cost and consideration of FGD retrofit. The Illinois coal is supplied through contract by Reiss Coal Company and Zeigler Coal Company by spot market. The coal is received by rail and barge. The Indiana coal is supplied by Solar Source Incorporated by spot market, while the Kentucky coal is received from Peyton Mining Company. The Fair Station is located in Montpelier.

TABLE 7-7
EASTERN IOWA LIGHT AND POWER COOPERATIVE
COAL-FIRED GENERATING STATION AND STATISTICS
1986

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
FAIR	1	1959	23.5	PC	COAL						
	2	1967	41.5	PC	COAL						
TOTAL			65.0			259,458	46	N.A.	N.A.	12,200	138,000

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
ILLINOIS	96.8	11,554	2.59	10.28	28.09	1.215	4.371
INDIANA	10.8	11,126	2.63	8.25	22.50	1.011	4.609
KENTUCKY	16.7	11,160	2.93	11.55	22.97	1.029	5.120
TOTAL	124.3	11,464	2.64	10.28	26.92	1.174	4.491

TOTAL CAPABILITY:	65 MEGAWATTS
COAL-FIRED CAPABILITY:	65 MEGAWATTS
TOTAL COAL PURCHASES:	124,300 TONS
ILLINOIS COAL PURCHASES:	96,800 TONS
TOTAL GENERATION:	0.3 BILLION KILOWATTHOURS
COAL-FIRED GENERATION:	0.3 BILLION KILOWATTHOURS

INTERSTATE POWER COMPANY

Interstate Power Company, headquartered in Dubuque, Iowa, is a combination public utility engaged in the production, purchase, transmission, distribution and sale of electricity, and the sale of natural gas. It sells electricity in 25 counties in northeastern Iowa, four counties in northwestern Illinois and 22 counties in southern Minnesota. In Illinois, it includes 15 municipalities. The economic base of its service territory consists of agriculture and diversified industry. The company employs aproximately 1,000.

Interstate serves 155 thousand electric customers. Electric sales are about four billion kilowatthours, with a value of $200 million. Total kilowatthours sold ranks Interstate as the fourth largest Iowa electric utility and the 89th largest U.S. electric utility.

Interstate has three coal-fired generating stations located in northern Iowa and one coal-fired station located in southern Minnesota. Interstate also owns about 22 percent (126 megawatts) of Iowa Public Service Company's Neal Station Unit 4 and owns four percent of Iowa-Illinois Gas and Electric Company's Louisa Station (26 megawatts). Interstate's coal-fired capability totals 868 megawatts, representing 99 percent of its total capability. The coal-fired capability located in Iowa represents 13 percent of Iowa's coal-fired capability and ten percent of the state's total capability.

Interstate has electrical interconnections with Northern States Power Company, Dairyland Power Cooperative, Iowa-Illinois Gas and Electric Company, Iowa Public Service Company, Iowa Electric Light and Power Company, Commonwealth Edison Company, Corn Belt Power Cooperative and Central Iowa Power Cooperative.

Interstate Power Company has electrical generation of 2.6 billion kilowatthours. Of this, coal accounts for most of the total. Interstate's Iowa generation represents 11 percent of the state's total generation.

Interstate Power Company purchased 1.4 million tons of coal in 1986. Illinois supplies 621 thousand tons, or 43 percent of the total coal receipts. Interstate's Illinois coal purchases represent five percent of all utility coal receipts in Iowa and 32 percent of the Illinois coal demand. Interstate has increased its Illinois coal receipts by about 100 thousand tons since 1981, while the delivered price has stayed at $1.66 per million BTU. Table 7-8 shows Interstate's Illinois coal purchases since 1983.

TABLE 7-8. INTERSTATE'S ILLINOIS COAL PURCHASES, QUALITY OF COAL AND DELIVERED PRICES 1983-1986.

YEAR	1983	1984	1985	1986
THOUSAND TONS	529	721	736	621
PERCENT SULFUR	2.88	2.93	2.97	2.96
BTU/LB	11,034	11,088	11,281	10,984
$/TON	36.41	37.08	37.39	36.41
$/MMBTU	1.66	1.67	1.66	1.66

The following paragraphs discuss Interstate's four coal-fired stations. For a discussion of the Neal Station, see the section on Iowa Public Service Company and for the Louisa Station see Iowa-Illinois Gas and Electric Company. Table 7-9 provides additional data on Interstate's coal-fired stations and companywide data. See Map 7-1 for the locations of the stations located in Iowa. For the location of the Fox Lake Station refer to Map 10-1 located under Minnesota.

The Dubuque Station is located in eastcentral Iowa at Dubuque. The station consists of three older pulverized coal units with capability of 78 megawatts. This figure represents nine percent of the company's total capability. It is the smallest coal-fired station owned by Interstate. Dubuque's generation of 0.2 billion kilowatthours represents 30 percent of the station's capability and eight percent of Interstate's total generation. Dubuque is Interstate's third most efficient station. The production expense averages 3.2 cents per kilowatthour, with the fuel expense at 2.5 cents.

Dubuque used a total of 127 thousand tons of Illinois and Indiana coal in 1986. The coal averages 11,048 BTU per pound of coal, with three percent sulfur. SO2 emissions are 5.2 pounds per million BTU of input. No information is available on the cost of FGD retrofit or its likelihood. Illinois supplies 98 percent of the station's coal demand. This coal is supplied by Consolidation Coal Company under contract through 1987, and is received by rail. The Indiana coal is purchased from Centran Corporation under contract through 1987.

The Fox Lake Station is located in southern Minnesota at Sherburn. It consists of one pulverized coal unit with capability of 84 megawatts. Fox Lake is the second smallest station in Interstate's system. The station's generation of 124 million kilowatthours accounts for 17 percent of its capability and five percent of Interstate's total generation. The cost per kilowatthour of generation is 3.7 cents, ranking Fox Lake as Interstate's least efficient station. The fuel expense is two cents per kilowatthour.

The 69 thousand tons of Indiana and Kentucky coal used in 1986 at the Fox Lake Station averages 10,734 BTU per pound of coal and 1.5 percent sulfur. SO2 emission are 2.8 pounds per million BTU of input. FGD retrofit information is not available. The Indiana coal is supplied by Lafayette Coal Company while the Kentucky coal is supplied by Centran Corporation, both by spot market.

The **Kapp Station** is located in east central Iowa at Clinton. The station has two pulverized coal units with capability of 235 megawatts, representing 27 percent of Interstate's total capability. Unit 8 is the newest and largest unit with 217 megawatts. The station's generation of one billion kilowatthours represents 49 percent of its capability and 38 percent of the company's total generation. Kapp is the most efficient Interstate coal-fired station. The production expense averages 2.3 cents per kilowatthour, with the fuel expense at 1.7 cents.

The 491 thousand tons of Illinois and Indiana coal burned in 1986 averages 10,975 BTU per pound of coal and 2.9 percent sulfur. SO2 emissions are 5.2 pounds per million BTU of input. Kapp is ranked 150th in total tons of SO2 emissions. FGD retrofit is rated difficult because of space constraints. The Illinois coal is supplied by Consolidation Coal Company under contract through January 1988; Zeigler Coal Company under contract through 1992; and Freeman United Coal Company by spot market. The coal is received by rail, barge, or combination of the two. The Indiana coal is supplied by Lafayette Coal Company by spot market.

The **Lansing Station** is located in northeastern Iowa at Lansing. It consists of four pulverized coal units with capability of 319 megawatts. The station represents 36 percent of Interstate's total capability. Lansing is the largest Interstate station. Unit 4 is the newest and burns a Wyoming compliance coal. The station's generation of 1.2 billion kilowatthours represents 44 percent of its capability and 46 percent of Interstate's total generation. It is Interstate's second most efficient plant. The average production expense per kilowatthour is 2.8 cents. The fuel expense averages 2.5 cents.

The 0.8 million tons of coal used in 1986 averages 8,596 BTU per pound of coal and 0.6 percent sulfur. Emissions of SO2 are 1.3 pounds per million BTU of input. One Illinois coal producer supplies eight percent of the station's coal needs, with the remainder from Wyoming. The Illinois coal is supplied by Consolidation Coal Company under contract through 1987. The Illinois coal is received by barge. The Wyoming coal is supplied by Amax Coal Company by contract through May 1996.

TABLE 7-9
INTERSTATE POWER COMPANY
COAL-FIRED GENERATING STATIONS AND STATISTICS
1986

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
DUBUQUE	2	1929	13.0	PC	COAL						
	3	1952	30.0	PC	COAL						
	4	1959	35.0	PC	COAL						
TOTAL			78.0			205,406	30	204	3.22	13,913	127,000

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
ILLINOIS	128.6	11,052	2.96	9.32	36.45	1.636	5.223
INDIANA	2.9	10,906	2.54	9.40	22.82	1.046	4.542
	131.5	11,048	2.95	9.33	36.15	1.636	5.207

TABLE 7-9 (CONTINUED)

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
FOX LAKE	3	1962	84.0	PC	COAL	124,122	17	215	3.68	11,934	69,000

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
INDIANA	70.1	10,624	1.53	9.73	33.05	1.555	2.808
KENTUCKY	3.0	13,307	1.44	5.40	47.08	1.769	2.110
TOTAL	73.1	10,734	1.53	9.56	33.62	1.566	2.779

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
KAPP	7	1947	18.0	PC	COAL						
	8	1967	217.0	PC	COAL						
TOTAL			235.0			1,008,694	49	177	2.25	10,685	491,000

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
ILLINOIS	434.3	10,981	2.98	9.60	36.38	1.657	5.292
INDIANA	70.6	10,940	2.46	8.78	23.88	1.091	4.385
TOTAL	504.9	10,975	2.90	9.48	34.63	1.580	5.153

TABLE 7-9 (CONTINUED)

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
LANSING	1	1948	14.5	PC	COAL						
	2	1949	10.7	PC	COAL						
	3	1957	33.8	PC	COAL						
	4	1977	260.0	PC	COAL						
TOTAL			319.0			1,218,182	44	365	2.75	11,558	819,000

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
ILLINOIS	57.6	10,854	2.86	9.69	36.67	1.689	5.138
WYOMING	632.8	8,390	0.34	4.73	38.30	2.228	0.790
TOTAL	690.4	8,596	0.55	5.14	38.16	2.220	1.248

TOTAL CAPABILITY:	875 MEGAWATTS
COAL-FIRED CAPABILITY:	868 MEGAWATTS
TOTAL COAL PURCHASES:	1,399,900 TONS
ILLINOIS COAL PURCHASES:	620,500 TONS
TOTAL GENERATION:	2.6 BILLION KILOWATTHOURS
COAL-FIRED GENERATION:	2.6 BILLION KILOWATTHOURS

IOWA ELECTRIC LIGHT AND POWER COMPANY

Iowa Electric Light and Power Company, headquartered in Cedar Rapids, Iowa, is a public utility engaged in the production, purchase, transmission, distribution and sale of electricity, and the sale of natural gas in 55 Iowa counties. The company has 0.2 million customers in 392 communities and an extensive rural area. The population is about 0.8 million. Other electrical sales are to 28 municipalities and one private utility. It also sells steam/hot water service to about 300 customers in Cedar Rapids. The economic base of its service territory consists of agriculture and diversified industry. The company employs 1,500.

Electric sales are approximately 4.3 billion kilowatthours, with a value of $284 million. Total kilowatthours sold ranks Iowa Electric as the second largest Iowa electric utility and the 85th largest, nationally.

Iowa Electric has three coal-fired generating stations located in east central Iowa. The company also owns 15 percent of Iowa Southern Utilities Company's Ottumwa coal-fired station (101 megawatts), and 70 percent of the Duane Arnold Energy Center (350 megawatts of nuclear capability) which it operates. Iowa Electric's total capability is 880 megawatts, with the coal-fired capability representing 53 percent of the total. Most of the remainder is nuclear. The coal-fired capability represents eight percent of Iowa's coal-fired capability and six percent of the state's total capability.

Iowa Electric has 3,096 miles of above ground lines and 1,635 miles of underground cable. The company has electrical interconnections with Iowa-Illinois Gas and Electric Company, Iowa Public Service Company, Iowa Power and Light Company, Corn Belt Power Cooperative and Iowa Southern Utilities Company.

Iowa Electric has generation of 4.3 billion kilowatthours. Of this, coal accounts for 1.3 billion kilowatthours, or 30 percent of the total, with most of the balance from nuclear. Iowa Electric's generation represents 18 percent of Iowa's total generation.

Iowa Electric purchased 704 thousand tons of coal in 1986. Of this total, Illinois supplies 491 thousand tons, or 70 percent. The Prairie Creek station receives 81 percent of the Illinois coal. The company's Illinois coal receipts represent four percent of Iowa's utility coal purchases and six percent of all utility coal purchases in Iowa. Table 7-10 lists Iowa Electric's Illinois coal purchases for the last two years. No Illinois coal sales were made prior to 1985. Since 1985, the company has decreased its Illinois coal receipts by 25 percent even though the delivered price has stayed the same.

TABLE 7-10. IOWA ELECTRIC'S ILLINOIS COAL PURCHASES, QUALITY OF COAL AND DELIVERED PRICES 1985 AND 1986.

YEAR	1985	1986
THOUSAND TONS	656	491
PERCENT SULFUR	2.35	3.02
BTU/LB	11,520	11,719
$/TON	32.15	33.02
$/MMBTU	1.40	1.41

The following paragraphs discuss Iowa Electric's three coal-fired stations. For a discussion of the Ottumwa station, see the section on Iowa Southern Utilities Company. Table 7-11 details the coal-fired generating stations and provides systemwide data.

The Prairie Creek Station is located in east central Iowa at Cedar Rapids. The station consists of four pulverized coal units with capability of 228 megawatts. Units 1 through 3 are operated by Iowa Electric but owned by Central Iowa Power Copperative. Unit 4 represents 15 percent of the company's total capability. Prairie Creek's generation of 0.7 billion kilowatthours represents 35 percent of the station's capability and 16 percent of Iowa Electric's total generation. The production expense is not available, but the fuel expense averages 1.6 cents per kilowatthour.

Prairie Creek used a total of 334 thousand tons of Illinois and Missouri coal in 1986. The coal averages 11,697 BTU per pound of coal and 2.2 percent sulfur. SO2 emissions are 3.7 pounds per million BTU of input. No data is available concerning the cost and consideration for FGD retrofit. Old Ben Coal Company supplies the Illinois coal under contract. The coal is received by rail. The Missouri coal is supplied by Missouri Mining Company by contract.

The Sixth Street Station is located in east central Iowa at Cedar Rapids. It consists of six older pulverized coal units with capability of 85 megawatts. Sixth Street is the smallest station in Iowa Electric's system. The station's generation of 71 million kilowatthours accounts for ten percent of its capability and a minimal amount of Iowa Electric's total generation. The cost per kilowatthour of generation is 6.6 cents, with the fuel expense at four cents.

The 69,000 tons of Illinois coal used in 1986 averages 11,724 BTU per pound of coal and 2.2 percent sulfur. Emissions of SO2 are 3.7 pounds per million BTU of input. The Illinois coal is supplied by Old Ben Coal Company under contract and received by railroad.

The Sutherland Station is located in east central Iowa at Marshalltown. The station has two pulverized coal units and one cyclone unit, with capability of 144 megawatts. The capability represents 16 percent of the company's total capability. The station's generation of 0.5 billion kilowatthours represents 39 percent of its capability and 12 percent of the company's total generation. The production expense is not available, but the fuel expense averages 1.6 cents per kilowatthour.

The 269,000 tons of Illinois, Iowa and Missouri coal burned in 1986 averages 11,438 BTU per pound of coal and 2.3 percent sulfur. SO2 emissions are 4.3 pounds per million BTU of input. Nationally, the station is ranked 176th in total tons of SO2 emissions. Sutherland is rated difficult for FGD retrofit because of age, size and limited space. The Illinois coal is supplied by Midland Coal Company and Old Ben Coal Company, both by contract. The coal is received by rail.

TABLE 7-11
IOWA ELECTRIC LIGHT AND POWER COMPANY
COAL-FIRED GENERATING STATIONS AND STATISTICS
1986

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
PRAIRIE	* 1	1950	22.0	PC	COAL						
CREEK	* 2	1951	22.0	PC	COAL						
	* 3	1958	49.0	PC	COAL						
	4	1967	135.0	PC	COAL						
TOTAL			228.0			701,831	35	N.A.	N.A.	11,133	334,000

* These 3 units are owned by Central Iowa Power Cooperative.

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
ILLINOIS	400.0	11,721	2.20	7.81	33.02	1.409	3.660
MISSOURI	18.0	11,168	2.30	8.35	30.63	1.371	4.016
	418.0	11,697	2.21	7.83	32.92	1.407	3.684

TABLE 7-11 (CONTINUED)

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
SIXTH STREET	1	1921	8.0	PC	COAL						
	2	1930	3.0	PC	COAL						
	4	1942	18.0	PC	COAL						
	5	1924	8.0	PC	COAL						
	7	1945	18.0	PC	COAL						
	8	1950	30.0	PC	COAL						
TOTAL			85.0			71,486	10	222	6.62	21,993	69,000

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
ILLINOIS	67.0	11,724	2.20	7.80	33.05	1.410	3.659

TABLE 7-11 (CONTINUED)

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
SUTHER-LAND	1	1955	31.5	PC	COAL						
	2	1955	32.0	PC	COAL						
	3	1961	80.0	CY	COAL						
TOTAL			143.5			489,307	39	N.A.	N.A.	11,477	269,000

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
ILLINOIS	24.0	10,875	2.52	9.43	30.48	1.401	4.519
IOWA	133.0	10,011	2.15	9.30	29.29	1.463	4.188
MISSOURI	62.0	11,185	2.62	7.32	30.40	1.359	4.568
TOTAL	219.0	10,438	2.32	8.75	29.74	1.424	4.334

TOTAL CAPABILITY: 880 MEGAWATTS
COAL-FIRED CAPABILITY: 465 MEGAWATTS
TOTAL COAL PURCHASES: 704,000 TONS
ILLINOIS COAL PURCHASES: 491,000 TONS
TOTAL GENERATION: 4.3 BILLION KILOWATTHOURS
COAL-FIRED GENERATION: 1.3 BILLION KILOWATTHOURS

Iowa-Illinois Gas and Electric Company (IIG&E) is a combination utility involved in the production, purchase, transmission, distribution and sale of electricity, and sale of natural gas. It sells electricity in five districts in east central Iowa and one district in northwestern Illinois, with a population of more than 600 thousand. The economic base of its service territory consists of agriculture and industry. IIG&E serves about 190 thousand electric customers. The company employs approximately 1,500. IIG&E is headquartered in Davenport, Iowa.

Electric sales are about four billion kilowatthours, with a value of $275 million. Total kilowatthours sold ranks IIG&E as the third largest Iowa electric utility and the 86th largest U.S. electric utility.

IIG&E has two coal-fired generating stations located in eastcentral Iowa, and partially owns four coal-fired generating stations and one nuclear station. The four partially owned coal-fired stations include: 29 percent (149 megawatts) of Iowa Public Service Company's Neal Station Unit 3; 19 percent (125 megawatts) of Iowa Southern Utilities Company's Ottumwa Station; 32 percent (227 megawatts) of Iowa Power and Light Company's Council Bluffs Station; and 43 percent (280 megawatts) of IIG&E's Louisa Station. The Louisa Station is operated by IIG&E. The company owns 25 percent (385 megawatts) of Commonwealth Edison Company's Quad Cities Station, which is nuclear.

IIG&E's capability totals 1,339 megawatts. Of this capability, coal-fired totals 954 megawatts, or 71 percent of the total. Most of the remainder is nuclear. The coal-fired capability represents 16 percent of Iowa's coal-fired capability and 12 percent of the state's total capability.

The company has 14,300 miles of above ground lines and 1,100 miles of underground cable. The company has electrical interconnections with Iowa Public Service Company, Iowa Electric Light and Power Company, Commonwealth Edison Company, Corn Belt Power Cooperative, Central Iowa Power Cooperative, Illinois Power Company, Union Electric Company, Iowa Power and Light Company, Interstate Power Company, Iowa Southern Utilities Company and Muscatine Power and Water.

IIG&E has generation of 6.2 billion kilowatthours. Of this, coal accounts for nearly four billion kilowatthours, or 63 percent of the total, with the balance from nuclear generation. IIG&E's in-state generation represents 16 percent of Iowa's total generation.

The company purchased approximately 0.6 million tons of coal in 1986. Of this total, Illinois supplies about 0.3 million tons, or 43 percent of the total. The Illinois coal is used at the Riverside station. The remaining coal needs are supplied by Wyoming coal producers. IIG&E's Illinois coal purchases represent three percent of Iowa's total utility coal receipts and 15 percent of Iowa's Illinois coal purchases. Since 1983, IIG&E has increased its Illinois coal receipts by a minimal amount even though the delivered price has fallen by 34 percent. Table 7-12 shows IIG&E's Illinois coal purchases for the past four years.

TABLE 7-12. **IIG&E'S ILLINOIS COAL PURCHASES, QUALITY OF COAL AND DELIVERED PRICES 1983-1986.**

YEAR	1983	1984	1985	1986
THOUSAND TONS	239	106	132	259
PERCENT SULFUR	2.76	2.76	2.39	2.41
BTU/LB	10,559	10,516	10,618	10,985
$/TON	36.51	38.06	26.43	26.31
$/MMBTU	1.73	1.81	1.25	1.15

The following paragraphs discuss IIG&E's two coal-fired stations. For a discussion of the Ottumwa station, see the section on Iowa Southern Utilities Company.

The Louisa Station is located in southeastern Iowa at Fruitland. The station consists of one new pulverized coal unit with capability of 650 megawatts. The station is jointly owned by IIG&E (43%) 280 megawatts; Iowa Power and Light Company (31%) 198 megawatts; Iowa Public Service Company (15%) 91 megawatts; Central Iowa Power Cooperative (5%) 30 megawatts; and Interstate Power Company (4%) 26 megawatts. The station is operated by IIG&E. The portion owned by IIG&E represents 21 percent of the company's total capability. It is the largest coal-fired station operated by IIG&E. Louisa's generation of 2.8 billion kilowatthours represents 49 percent of the station's capability, while the 1.2 billion kilowatthours owned by IIG&E represents 19 percent of the company's total generation. The production expense averages 2.2 cents per kilowatthour, with the fuel expense at 1.9 cents. Louisa is the most efficient of the two coal-fired stations.

Louisa consumed 1.8 million tons of Wyoming coal in 1986. The coal averages 8,331 BTU per pound of coal, with 0.4 percent sulfur. SO2 emissions are 0.9 pound per million BTU of input. Because of its in-service date, Louisa must meet the U.S. Environmental Protection Agency's New Source Performance Standard. The Wyoming coal is supplied by Cordero Mining Company by contract through May 2003 and, Mobil Oil Mining and Coal Division by contract.

The Riverside Station is located in souteastern Iowa at Bettendorf. It consist of two pulverized coal units with capability of 173 megawatts. Riverside is the smallest station in IIG&E's system, with 13 percent of IIG&E's total capability. The station's generation of 0.4 billion kilowatthours accounts for 27 percent of its capability and six percent of IIG&E's total generation. The cost per kilowatthour of generation is 3.6 cents, while the fuel cost averages 2.3 cents.

The coal used in 1986 averages 10,963 BTU per pound of coal and 2.4 percent sulfur. The station has an $SO2$ emission rate of 4.3 pounds per million BTU of input. No information is available concerning the likelihood of FGD retrofit. The 259,000 tons of Illinois coal is supplied by Midland Coal Company under contract and Old Ben Coal Company by contract and spot market. The coal is received by rail. The Indiana coal is supplied by Amax Coal Company, Peabody Coal Company and Vigo Coal Company, all by contract.

Table 7-13 provides additional data on the two coal-fired stations and systemwide data. Refer to Map 7-1 for the locations of these stations.

TABLE 7-13
IOWA-ILLINOIS GAS AND ELECTRIC COMPANY
COAL-FIRED GENERATING STATIONS AND STATISTICS
1986

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
LOUISA	* 1	1983	650.0	PC	COAL	2,772,960	49	814	2.23	9,663	1,800,000

* Company owns 43% of the station.

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
WYOMING	1,820.0	8,331	0.38	5.64	19.48	1.169	0.889

TABLE 7-13 (CONTINUED)

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA- BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
RIVERSIDE	4	1949	50.1	PC	COAL						
	5	1961	122.5	PC	COAL						
TOTAL			172.6			402,499	27	224	3.57	15,688	288,000

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
ILLINOIS	259.0	10,985	2.41	9.72	25.36	1.166	4.278
INDIANA	44.0	10,830	2.47	9.47	26.70	1.233	4.447
TOTAL	303.0	10,963	2.42	9.69	25.55	1.166	4.304

TOTAL CAPABILITY: 1,339 MEGAWATTS
COAL-FIRED CAPABILITY: 954 MEGAWATTS
TOTAL COAL PURCHASES: 595,700 TONS
ILLINOIS COAL PURCHASES: 259,000 TONS
TOTAL GENERATION: 6.2 BILLION KILOWATTHOURS
COAL-FIRED GENERATION: 3.9 BILLION KILOWATTHOURS

IOWA SOUTHERN UTILITIES COMPANY

Iowa Southern Utilities Company is a combination utility engaged in the production, purchase, transmission, distribution and sale of electricity, and the sale of natural gas. Electric sales are to 93 thousand customers located in 24 counties (160 communities) in southern and southeastern Iowa, with a population of more than 215 thousand. Other electrical sales are with six municipalities and one private utility. The economic base of the service territory consists of diversified agriculture and diversified industry. The company employs about 500. Iowa Southern is headquartered in Centerville, Iowa.

Electric sales are approximately two billion kilowatthours, with a value of $101 million. Total kilowatthours sold, ranks Iowa Southern the sixth largest Iowa electric utility, and 99th, nationally.

Iowa Southern has two coal-fired generating stations located in southeastern Iowa. The Ottumwa Station, which is operated by Iowa Southern, is jointly owned by Iowa Southern (33%); Iowa Public Service Company (19%); Iowa-Illinois Gas and Electric Company (19%); Iowa Power and Light Company (15%); and Iowa Electric Light and Power Company (15%). Iowa Southern also owns (28%) 144 megawatts of Iowa Public Service Company's George Neal Station Unit 3. Iowa Southern's total capability is 580 megawatts, with the coal-fired capability accounting for all but six megawatts. The coal-fired capability represents ten percent of Iowa's coal-fired capability and seven percent of the state's total capability.

Iowa Southern has 4,200 miles of above ground power lines. The company has electrical interconnections with Iowa-Illinois Gas and Electric Company, Iowa Electric Light and Power Company, Iowa Power and Light Company, Union Electric Company, Central Iowa Power Cooperative and Associated Electric Cooperative.

Iowa Southern has electric generation of nearly two billion kilowatthours. Coal generation accounts for all of the total. Iowa Southern's generation represents eight percent of Iowa's total generation.

Iowa Southern purchased 2.3 million tons of coal in 1986. Of this total, Illinois supplies 20,000 tons, representing less than one percent of the total. The Illinois coal is used at the Burlington Station and represents seven percent of its coal demand. One Wyoming coal producer supplies 87 percent of Iowa Southern's total coal receipts. Iowa Southern's Illinois coal purchases represent a small portion of Iowa's total coal demand. Table 7-14 shows Iowa Southern's Illinois coal purchases for the past four years. As the table indicates, Iowa Southern has reduced its Illinois coal receipts by 311,000 tons since 1983, even though the delivered price has fallen by 28 percent.

TABLE 7-14. IOWA SOUTHERN'S ILLINOIS COAL PURCHASES, QUALITY OF COAL AND DELIVERED PRICES 1983-1986.

YEAR	1983	1984	1985	1986
THOUSAND TONS	331	75	144	20
PERCENT SULFUR	2.79	2.74	2.97	2.98
BTU/LB	11,257	10,371	10,919	10,917
$/TON	36.37	26.35	27.02	25.49
$/MMBTU	1.62	1.27	1.24	1.17

The following paragraphs discuss Iowa Southern's two coal-fired stations. For a discussion of the George Neal Station, see the section on Iowa-Illinois Gas and Electric Company. Table 7-15, at the end of this narrative provides statistics on the two coal-fired stations and systemwide data.

The Burlington Station is located in southeastern Iowa at Burlington. The station consists of one pulverized coal unit with capability of 207 megawatts. This figure represents 36 percent of the company's total capability. Burlington's generation of 0.6 billion kilowatthours represents 35 percent of the station's capability and 32 percent of Iowa Southern's total generation. The production expense per kilowatthour is 2.3 cents, with the fuel expense at 1.2 cents. Burlington ranks second in economic efficiency.

Burlington consumed 0.3 million tons of Illinois and Indiana coal in 1986. This coal averages 10,860 BTU per pound of coal and 2.6 percent sulfur. SO2 emissions are 4.6 pounds per million BTU of input. No data is available concerning the cost consideration for FGD retrofit. Illinois coal producers supply seven percent of the station's coal demand. The coal is supplied by Peabody Coal Company and Freeman United Coal Mining Company by spot market. The coal is received by railroad. The Indiana coal is supplied by Lafayette Coal Company by contract and Amax Coal Company by spot market.

The Ottumwa Station is located in southeastern Iowa at Chillecothe. It consists of one pulverized coal unit with capability of 675 megawatts. The station is operated by Iowa Southern and jointly owned by Iowa Southern (33%); Iowa Public Service Company (19%); Iowa-Illinois Gas and Electric Company (19%); Iowa Power and Light Company (15%); and Iowa Electric Light and Power Company (15%). The station's generation of 3.2 billion kilowatthours accounts for 55 percent of its capability. Iowa Southern's share of the generation is 1.1 billion kilowatthours, representing 58 percent of Iowa Southern's total generation. The cost per kilowatthour of generation is 1.6 cents, with the fuel expense at 1.4 cents. Ottumwa is the most efficient of the two coal-fired stations.

The 2.1 million tons of Wyoming coal used in 1986 at the Ottumwa Station averages 8,287 BTU per pound of coal and 0.4 percent sulfur. The SO2 emission rate is 0.9 pound per million BTU of input. Because of Ottumwa's in-service date, it must meet the U.S. Environmental Protection Agency's New Source Performance Standard. The Wyoming coal is supplied by Cordero Mining Company under contract through 2001.

TABLE 7-15
IOWA SOUTHERN UTILITIES COMPANY
COAL-FIRED GENERATING STATIONS AND STATISTICS
1986

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
BURLINGTON	1	1968	207.0	PC	COAL	631,937	35	N.A.	2.30	10,861	316,000

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
ILLINOIS	19.8	10,917	2.98	10.17	25.49	1.167	5.323
INDIANA	272.9	10,856	2.52	9.26	23.42	1.079	4.527
	292.7	10,860	2.55	9.32	23.56	1.085	4.579

TABLE 7-15 (CONTINUED)

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
OTTUMWA	* 1	1981	675.0	PC	COAL	3,242,927	55	509	1.56	10,745	2,116,000

* The Company owns 33% of the station.

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
WYOMING	2,018.6	8,287	0.39	5.82	19.99	1.206	0.918

TOTAL CAPABILITY: 580 MEGAWATTS
COAL-FIRED CAPABILITY: 574 MEGAWATTS
TOTAL COAL PURCHASES: 2,311,300 TONS
ILLINOIS COAL PURCHASES: 19,800 TONS
TOTAL GENERATION: 1.9 BILLION KILOWATTHOURS
COAL-FIRED GENERATION: 1.9 BILLION KILOWATTHOURS

MUSCATINE POWER AND WATER DEPARTMENT

Muscatine Power and Water Department is a municipally-owned electric utility located in east central Iowa. Muscatine's service territory consists of the City of Muscatine with a population of 24,000. The department supplies electrical service to 10,000 customers. Electric sales are approximately one billion kilowatthours, with a value of nearly $50 million.

Muscatine purchased 0.5 million tons of Illinois coal in 1986. The department's Illinois coal receipts represent four percent of Iowa's total coal demand and 25 percent of Illinois coal receipts in Iowa. Table 7-16 details the department's Illinois coal purchases for the past four years. Since 1983, Muscatine's Illinois coal purchases have stayed relatively the same at 0.5 million tons, while the delivered price has increased by six percent.

TABLE 7-16. MUSCATINE'S ILLINOIS COAL PURCHASES, QUALITY OF COAL AND DELIVERED PRICES 1983-1986.

YEAR	1983	1984	1985	1986
THOUSAND TONS	487	170	488	484
PERCENT SULFUR	3.23	3.01	2.93	3.12
BTU/LB	11,567	11,124	11,383	11,280
$/TON	41.63	45.75	43.10	43.10
$/MMBTU	1.80	2.06	1.89	1.91

Muscatine Power and Water Department has one coal-fired generating station located in Muscatine. The following paragraphs discuss this station.

The Muscatine Station consists of two pulverized coal units and one cyclone unit with total capability of 259 megawatts. Muscatine's generation of one billion kilowatthours represents 45 percent of its capability. Information is not available on the cost per kilowatthour of generation, but the fuel expense averages two cents per kilowatthour.

The station consumed 478 thousand tons of Illinois coal in 1986. The coal averages 11,280 BTU per pound of coal and 3.1 percent sulfur. The SO2 emission rate is 2.9 pounds per million BTU of input. The coal is supplied by Freeman United Coal Mining Company by spot market and received by rail.

Muscatine's Unit 9 must meet the U.S. Environmental Protection Agency's New Source Performance Standard. It utilizes a limestone FGD system rated at 150 megawatts. The FGD system came on-line in 1983 and is designed to remove up to 90 percent of SO2. Its emission rate is 1.2 pounds of SO2 per million BTU of input. The station's overall SO2 emission rate is 2.9 pounds per million BTU of input. Table 7-17 provides additional data on Muscatine's electric operations.

TABLE 7-17
MUSCATINE POWER AND WATER DEPARTMENT
COAL-FIRED GENERATING STATION AND STATISTICS
1986

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
MUSCATINE	7	1959	25.2	PC	COAL						
	8	1969	79.1	CY	COAL						
	* 9	1982	155.1	PC	COAL						
TOTAL			259.4			1,012,370	45	N.A.	N.A.	10,652	478,000

* Unit 9 is equipped with FGD.

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	FGD REMOVAL (%)	SO2 LB/MMBTU
ILLINOIS	484.3	11,280	3.12	6.21	43.10	1.910	90	2.880

TOTAL CAPABILITY:	259 MEGAWATTS
COAL-FIRED CAPABILITY:	259 MEGAWATTS
TOTAL COAL PURCHASES:	484,300 TONS
ILLINOIS COAL PURCHASES:	484,300 TONS
TOTAL GENERATION:	1.0 BILLION KILOWATTHOURS
COAL-FIRED GENERATION:	1.0 BILLION KILOWATTHOURS

CHAPTER EIGHT

KANSAS

Kansas electric utilities purchased approximately 14 million tons of coal; 0.1 million barrels of petroleum; and 11 billion cubic feet of natural gas in 1986. Coal represented two percent of U.S. utility coal purchases, while petroleum and natural gas purchases were only negligible. On a BTU basis, Kansas utilities purchased one percent of the U.S. total energy inputs. Table 8-1 lists the fossil-fuel sources used by Kansas electric utilities.

TABLE 8-1. KANSAS FOSSIL-FUEL SOURCES FOR ELECTRIC GENERATION.

FUEL	QUANTITY (000)	BTU (BILLION)	% OF TOTAL	$/UNIT	$/MMBTU
COAL	13,903 tons	242,692	95.4	23.02	1.32
PETROLEUM	109 bls.	636	.3	19.54	3.36
NATURAL GAS	11,349 mmcf.	10,994	4.3	2.42	2.50
TOTAL		254,322	100.0		

Kansas has three investor-owned utilities, 120 municipal systems, 37 rural electric cooperatives and one state system. The major suppliers of electricity are Kansas Power and Light Company; Kansas Gas and Electric Company; Kansas City Board of Public Utilities; Sunflower Electric Cooperative, Incorporated; and Western Power Centel Corporation. These five utilities account for about 85 percent of the state's electrical generation.

Kansas electric utilities have 9,457 megawatts of capability, representing one percent of the U.S. total capability. This capability consists of 5,010 megawatts of coal-fired; 2,750 megawatts of natural gas-fired; 1,117 megawatts of nuclear-fired; 578 megawatts of petroleum-fired; and two megawatts of water. Of the 44 states that have coal-fired generation, Kansas ranks 18th. Table 8-2 breaks down the various fuel types by capability, number of units, percent of Kansas' total capability and percent of U.S. total capability.

TABLE 8-2. KANSAS SUMMER CAPABILITY.

TYPE OF CAPABILITY	TOTAL	COAL	NUCLEAR	PETROLEUM	NATURAL GAS	WATER
MEGAWATTS	9,457	5,010	1,117	578	2,750	2
NO. OF UNITS	435	20	1	234	171	7
% OF KS TOTAL	100	53	12	6	29	--
% OF U.S. TOTAL	1	2	1	1	2	--

The Empire District Electric Company has plans of constructing a 72 megawatt coal-fired unit. Table 8-3 details this future expansion.

TABLE 8-3. FUTURE BASELOAD CAPABILITY IN KANSAS.

UTILITY	STATION AND UNIT	CAPABILITY (MW)	TYPE	ON LINE
EMPIRE DIST. ELECTRIC CO.	RIVERTON 1	72	COAL	PLANNED

Net generation by Kansas electric utilities totals 30 thousand gigawatthours, a seven percent increase over 1985. Broken down by energy source, coal supplies 72 percent of the total and nuclear 24 percent. On a national basis, Kansas accounts for one percent of total generation and is ranked 29th among the states in total generation. For the U.S. total, coal and nuclear generates two percent, each. Table 8-4 details each category of generation.

TABLE 8-4. KANSAS NET GENERATION.

TYPE OF CAPABILITY	TOTAL	COAL	NUCLEAR	PETROLEUM	NATURAL GAS	WATER
GIGAWATTHOURS	29,531	21,362	6,959	84	1,117	8
% OF KS TOTAL	100	72	24	--	4	--
% OF U.S. TOTAL	1	2	2	--	--	--

Kansas utilities purchased approximately 14 million tons of coal in 1986. This coal is supplied by five coal producing states. The sulfur content varies from 0.4 percent to five percent, with a weighted average of 0.9 percent. The BTU content varies from 8,524 to 11,960 per pound of coal, with an average of 8,728. On a BTU cost basis, Kansas and Missouri coals have the lowest delivered price at $1.21 per million BTU, while Illinois coal is the most expensive at $1.65 per million BTU. Table 8-5 lists the various coal supplying states and their respective quantities and qualities of coal sold to Kansas.

TABLE 8-5. KANSAS COAL SUPPLIERS.

STATE/REGION	TONS (000)	% OF TOTAL	BTU/LB	% SULFUR	$/TON	$/MMBTU
WYOMING	11,926	86	8,524	.36	22.57	1.32
KANSAS	1,086	8	9,589	4.78	23.28	1.21
MISSOURI	512	4	9,527	4.86	23.07	1.21
ILLINOIS	284	2	11,471	2.48	37.84	1.65
OKLAHOMA	96	--	11,960	2.74	32.60	1.36
TOTAL	13,904	100	8,728	.93	23.02	1.32

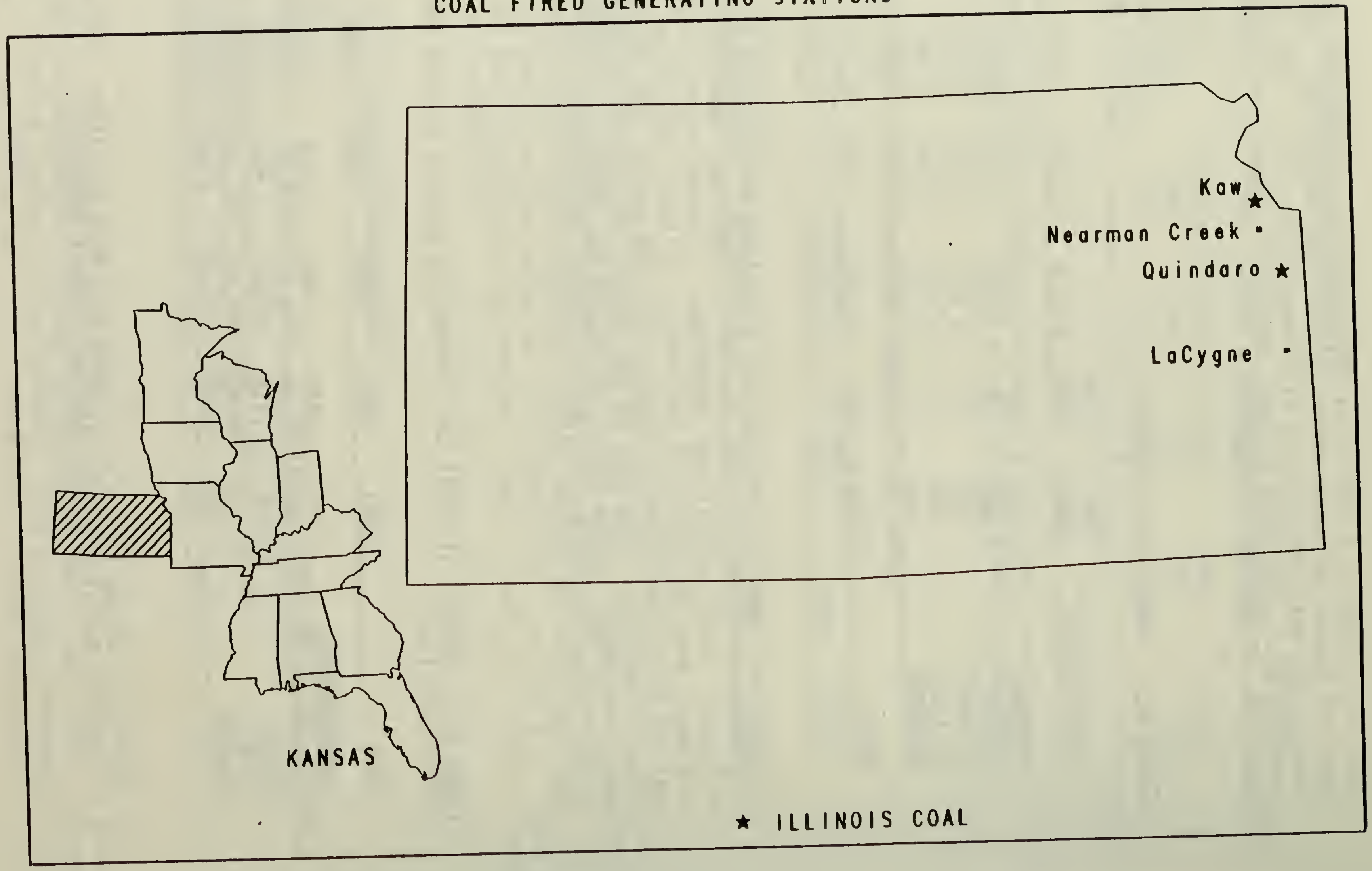
Illinois coal suppliers sold about 0.3 million tons of coal to the Kansas City Board of Public Utilities in 1986. This coal represents two percent of Kansas' total utility coal purchases. The major coal supplying state is Wyoming with 86 percent of the total. Illinois coal sales, quality of coal and delivered prices to Kansas, for the period 1981 through 1986 are shown in Table 8-6. As seen in the table, the demand for Illinois coal peaked in 1984. Since then, the demand has decreased by more than 50 percent even though the delivered price has fallen by $.85 per million BTU.

TABLE 8-6. KANSAS' ILLINOIS COAL PURCHASES, QUALITY OF COAL AND DELIVERED PRICES 1981-1986.

YEAR	1981	1982	1983	1984	1985	1986
THOUSAND TONS	347	468	481	628	492	284
PERCENT SULFUR	2.60	2.70	2.50	2.60	2.60	2.48
BTU/LB	11,206	11,316	11,332	11,360	11,313	11,471
$/TON	40.31	46.90	54.84	56.90	56.16	37.84
$/MMBTU	1.80	2.08	2.43	2.50	2.48	1.65

A discussion of the Kansas City Board of Public Utilities follows. Map 8-1 shows the location of the stations in this section.

MAP 8 -1
COAL FIRED GENERATING STATIONS



KANSAS CITY BOARD OF PUBLIC UTILITIES

The Kansas City Board of Public Utilities (KC) is a municipally-owned utility located in Kansas City, Kansas. The utility supplies electricity to about 78,000 customers in Kansas City. Other sales include utilities, cities and wholesale customers. Electric sales are approximately two billion kilowatthours, with a value of $110 million. The service territory consists of manufacturing, business and service support.

The utility has three coal-fired generating stations located in Kansas City. The 592 megawatts of coal-fired capability represents 85 percent of the utility's total capability. KC's coal-fired capability further represents 14 percent of Kansas' coal-fired capability and seven percent of the state's total capability. KC's generation of two billion kilowatthours represents seven percent of statewide generation.

KC purchased 1.2 million tons of coal in 1986. Illinois coal producers supply 0.3 million tons, or 23 percent of the total. The Illinois coal receipts represent two percent of Kansas' total utility coal demand and all of the Illinois coal receipts. Table 8-7 details the utility's Illinois coal purchases for the past four years. KC's Illinois coal demand peaked in 1984 at about 0.6 million tons. Since then, sales have decreased by 55 percent even though the delivered price has fallen by 33 percent.

TABLE 8-7. KANSAS CITY BOARD OF PUBLIC UTILITIES' ILLINOIS COAL PURCHASES, QUALITY OF COAL AND DELIVERED PRICES 1983-1986.

YEAR	1983	1984	1985	1986
THOUSAND TONS	480	628	492	284
PERCENT SULFUR	2.46	2.62	2.58	2.48
BTU/LB	11,330	11,360	11,312	11,437
$/TON	54.75	56.90	56.15	38.49
$/MMBTU	2.42	2.50	2.48	1.68

The remainder of this section discusses KC's three coal-fired generating stations. Table 8-8 provides additional data on these stations. Refer to Map 8-1 for the locations of these stations.

The Kaw Station has two older pulverized coal units and one older cyclone unit with total capability of 129 megawatts, representing 19 percent of the utility's total capability. The station's generation of 146 million kilowatthours, represents 13 percent of its capability and ten percent of the utility's total generation. No information is available on the cost of generation, but the fuel expense averages 2.2 cents per kilowatthour.

Kaw consumed 88,000 tons of Illinois coal in 1986. The coal averages 11,559 BTU per pound of coal and 2.5 percent sulfur. The SO2 emission rate is 4.2 pounds per million BTU of input. Cost consideration and likelihood for FGD retrofit are not available. The Illinois coal is supplied by Kenellis Energy Incorporated under contract through 1997, and Old Ben Company by spot market. The coal is received by rail.

The Nearman Creek Station has one new pulverized coal unit with capability of 235 megawatts, representing 35 percent of the utility's total capability. The station's generation of 1.3 billion kilowatthours, represents 63 percent of its capability and 65 percent of KC's total generation. The fuel expense averages two cents per kilowatthour of generation.

The station consumed 0.9 million tons of Wyoming compliance coal in 1986. This coal averages 8,416 BTU per pound of coal and 0.3 percent sulfur. The SO2 emission rate is 0.7 pound per million BTU of input. Because of its in-service date, the Nearman Station must meet the U.S. Environmental Protection Agency's New Source Performance Standard. The Wyoming coal is supplied by Carter Mining Company, by contract through 2001.

The Quindaro Station has one pulverized coal unit and one cyclone unit with capability of 228 megawatts, representing 34 percent of the utility's total capability. The station's generation of 0.5 billion kilowatthours, represents 26 percent of its capability and 25 percent of KC's total generation. The fuel expense averages two cents per kilowatthour.

Quindaro consumed 264,000 tons of Illinois coal in 1986. The coal averages 11,437 BTU per pound of coal and 2.5 percent sulfur. The SO2 emission rate is 4.2 pounds per million BTU of input. No information is available concerning the cost and likelihood for FGD retrofit. The Illinois coal is supplied by Kenellis Energy Incorporated by contract through 1997, and Old Ben Coal Company by spot market. The coal is received by rail.

TABLE 8-8
KANSAS CITY BOARD OF PUBLIC UTILITIES
COAL-FIRED GENERATING STATIONS AND STATISTICS
1986

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
KAW	1	1955	37.0	PC	COAL						
	2	1957	37.0	PC	COAL						
	3	1962	55.0	CY	COAL						
TOTAL			129.0			145,837	13	N.A.	N.A.	13,950	88,000

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
ILLINOIS	79.1	11,559	2.48	8.87	36.17	1.565	4.184

TABLE 8-8 (CONTINUED)

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
NEARMAN CREEK	1	1981	235.0	PC	COAL	1,287,655	63	N.A.	N.A.	11,660	892,000

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
WYOMING	954.7	8,416	0.29	4.72	20.54	1.220	0.672

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
QUINDARO	1	1966	73.0	CY	COAL						
	2	1971	155.0	PC	COAL						
TOTAL			228.0			520,991	26	N.A.	N.A.	11,590	264,000

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
ILLINOIS	204.8	11,437	2.48	9.72	38.49	1.683	4.228

TOTAL CAPABILITY:	676 MEGAWATTS
COAL-FIRED CAPABILITY:	592 MEGAWATTS
TOTAL COAL PURCHASES:	1,238,600 TONS
ILLINOIS COAL PURCHASES:	283,900 TONS
TOTAL GENERATION:	2.0 BILLION KILOWATTHOURS
COAL-FIRED GENERATION:	2.0 BILLION KILOWATTHOURS

CHAPTER NINE

KENTUCKY

Kentucky electric utilities purchased approximately 28 million tons of coal; 0.2 million barrels of petroleum; and 0.4 million cubic feet of natural gas in 1986. Coal represented four percent of U.S. utility coal purchases, while petroleum and natural gas were only negligible. These figures further represented four percent of the total U.S. BTU purchases by electric utilities. Table 9-1 lists the fossil-fuel categories for Kentucky electric utilities during 1986.

TABLE 9-1. KENTUCKY FOSSIL-FUEL SOURCES FOR ELECTRIC GENERATION.

FUEL	QUANTITY (000)	BTU (BILLION)	% OF TOTAL	$/UNIT	$/MMBTU
COAL	28,148 tons	648,706	99.7	30.84	1.34
PETROLEUM	241 bls.	1,404	.2	20.42	3.50
NATURAL GAS	414 mmcf.	424	.1	3.03	2.97
TOTAL		650,534	100.0		

Kentucky has six investor-owned utilities, 29 municipal systems, 28 rural electric cooperatives and one U.S. Government system. The major suppliers of electricity are the Tennessee Valley Authority, Louisville Gas and Electric Company, Kentucky Utilities Company, Big Rivers Electric Coöperative, East Kentucky Power Cooperative and Kentucky Power Company. These utilities account for about 90 percent of Kentucky's total generation.

Kentucky electric utilities have 15,110 megawatts of capability, representing two percent of the U.S. total capability. This capability consists of 13,919 megawatts of coal-fired; 782 megawatts of water; 223 megawatts of natural gas-fired; and 186 megawatts of petroleum-fired. Of the 44 states that have coal-fired capability, Kentucky ranks seventh.

Table 9-2 breaksdown the various fuel types by capability, number of units, percent of Kentucky's total capability and percent of U.S. total capability. For example, the 13,919 megawatts of Kentucky coal capability represents five percent of the total U.S. coal capability.

TABLE 9-2. KENTUCKY SUMMER CAPABILITY.

TYPE OF CAPABILITY	TOTAL	COAL	PETROLEUM	NATURAL GAS	WATER
MEGAWATTS	15,110	13,919	186	223	782
NO. OF UNITS	111	59	15	7	30
% OF KY TOTAL	100	92	1	2	5
% OF U.S. TOTAL	2	5	--	--	1

Two new coal-fired stations are under construction in Kentucky. The companies and stations statistics are shown in Table 9-3.

TABLE 9-3. FUTURE BASELOAD CAPABILITY IN KENTUCKY.

UTILITY	STATION AND UNIT	CAPABILITY (MW)	FUEL	ON LINE
E. KY. POWER COOP.	Smith 1	602	Coal	1992
LOUISVILLE GAS & ELEC.	Trimble County 1	526	Coal	1991
TOTAL		1,128		

Net generation by Kentucky electric utilities totals 67 thousand gigawatthours, an increase of six percent from 1985. This figure ranks Kentucky as the 15th largest producing state in the nation. Coal produces 96 percent of the total generation. On a national basis, Kentucky accounts for three percent of total generation, while coal generates five percent of the U.S. total coal-fired generation. Table 9-4 details each of the categories of generation.

TABLE 9-4. KENTUCKY NET GENERATION.

TYPE OF CAPABILITY	TOTAL	COAL	PETROLEUM	NATURAL GAS	WATER
GIGAWATTHOURS	66,915	64,012	127	43	2,734
% OF KY TOTAL	100	96	--	--	4
% OF U.S. TOTAL	3	5	--	--	1

In 1986, Kentucky utilities purchased approximately 28 million tons of coal. This coal is supplied by seven coal producing states. The sulfur content varies from 0.7 percent to 3.5 percent, with a weighted average of 2.5 percent. The BTU content varies from 11,075 to 12,304 per pound of coal, with an average of 11,523. On a BTU cost basis, Tennessee coal has the lowest delivered price at $1.01 per million BTU, while Pennsylvania coal is the most expensive at $1.62 per million BTU. Table 9-5 lists the various coal supplying states, or regions, and their respective quantities and qualities of coal sold to Kentucky.

TABLE 9-5. KENTUCKY COAL SUPPLIERS.

STATE/REGION	TONS (000)	% OF TOTAL	BTU/LB	% SULFUR	$/TON	$/MMBTU
W. KENTUCKY	14,173	50	11,075	3.52	27.37	1.24
E. KENTUCKY	8,089	29	12,135	1.29	35.83	1.48
W. VIRGINIA	2,680	10	12,630	.68	36.80	1.46
INDIANA	2,556	9	11,135	2.62	29.22	1.31
OHIO	546	2	11,187	2.23	26.93	1.20
ILLINOIS	65	--	11,949	.93	34.70	1.45
TENNESSEE	29	--	12,304	1.81	24.80	1.01
PENNSYLVANIA	11	--	11,225	2.60	36.45	1.62
TOTAL/AVERAGE	28,149	100	11,523	2.49	30.84	1.34

Illinois coal suppliers sold about 65,000 tons of coal to the Tennessee Valley Authority's Shawnee Station located in Kentucky. The Illinois coal represents less than one percent of Kentucky's total utility coal receipts. The major coal supplying state is Kentucky with 79 percent of the total. Illinois coal sales, quality of coal and delivered prices to Kentucky for 1985 and 1986 are shown in Table 9-6. As seen in the table, the Tennessee Valley Authority is buying a quality Illinois coal with less than one percent sulfur and about 12,000 BTU per pound of coal. The TVA did not purchase any Illinois coal in 1983 and 1984.

TABLE 9-6. KENTUCKY'S ILLINOIS COAL PURCHASES AND DELIVERED PRICES 1985 and 1986.

YEAR	1985	1986
THOUSAND TONS	184	65
PERCENT SULFUR	1.50	.90
BTU/LB	11,904	11,949
$/TON	33.44	34.70
$/MMBTU	1.40	1.45

A discussion of the Tennessee Valley Authority and its two coal-fired stations located in Kentucky follows. See Map 2-1, Alabama, for the locations of these generating stations.

The Tennessee Valley Authority has 3,949 megawatts of capability located in Kentucky. This capability consists of two coal-fired stations with capability of 3,774 megawatts (96% of TVA's Kentucky capability) and five hydro units rated at 175 megawatts. This capability represents 14 percent of the TVA's total capability. Statewide, the TVA capability represents about 26 percent of Kentucky's coal-fired and total capability.

TVA's Kentucky generation is approximately 19 billion kilowatthours, representing 28 percent of Kentucky's total generation. For TVA's Kentucky generation, coal accounts for almost all of the total.

The TVA purchased approximately eight million tons of coal in 1986 for its two stations in Kentucky. Of this total, 65,000 tons were from Illinois, representing only a minimal amount of its total demand. Table 9-7 details TVA's Illinois coal purchases for its Kentucky generating stations for the last two years. The TVA facilities in Kentucky purchased no Illinois coal for 1983 and 1984.

TABLE 9-7. TVA'S ILLINOIS COAL PURCHASES, QUALITY OF COAL AND DELIVERED PRICES 1985 AND 1986.

YEAR	1985	1986
THOUSAND TONS	107	65
PERCENT SULFUR	.90	.90
BTU/LB	12,069	11,949
$/TON	34.76	34.70
$/MMBTU	1.44	1.45

The following paragraphs discuss the TVA's two coal-fired stations located in Kentucky. Table 9-8, at the end of the narrative, provides additional data on these stations. Refer to Map 2-1, Alabama, for the locations of these two stations.

The Paradise Station is located in southwestern Kentucky at Drakesboro. The plant has three cyclone units with capability of 2,264 megawatts. The station accounts for 57 percent of TVA's Kentucky capability. The station's 12.6 billion kilowatthours of generation represents 64 percent of its capability and 68 percent of TVA's Kentucky generation. The average cost of generation is 1.7 cents per kilowatthour. The fuel expense averages 1.4 cents per kilowatthour. Of TVA's coal-fired stations, Paradise is the most efficient.

The 5.4 million tons of Kentucky and Ohio coal consumed in 1986 averages 4.1 percent sulfur and 10,998 BTU per pound of coal. The major Kentucky coal suppliers are Peabody Coal Company by contract; Green River Coal Company by contract; and Brown Badget Incorporated by contract.

Paradise's Units 1 and 2 are equipped with limestone FGD systems that remove about 85 percent of the SO2 emissions. The two retrofitted scrubbers came on-line in 1983. No capital cost or operating expense are available. Overall, the station has an SO2 emission rate of 4.4 pounds per million BTU of input. Paradise is ranked number two nationally in total tons of SO2 emissions. Paradise's Unit 3 is rated easy for FGD retrofit because of age, size and availability of space.

The Shawnee Station is located in northwestern Kentucky at Paducah. The station consists of ten older pulverized coal units rated at 1,510 megawatts of capability. The station represents 38 percent of TVA's Kentucky capability. The station's generation of 5.9 billion kilowatthours represents 44 percent of the station's capability and 31 percent of TVA's Kentucky generation. The average cost per kilowatthour of generation is two cents. The fuel expense averages 1.7 cents per kilowatthour. Shawnee is TVA's second most efficient coal-fired station.

The 2.5 million tons of coal consumed in 1986 averages 12,349 BTU per pound of coal and one percent sulfur. SO2 emissions are 1.6 pounds per million BTU of input. Nationally, Shawnee ranks 36th in total tons of SO2 emissions. Information concerning the cost and likelihood of FGD retrofit are not available. The coal is supplied by Illinois, Kentucky and West Virginia coal operators. The Illinois coal is supplied by Inland Steel Coal Company, by spot market. The major West Virginia coal suppliers are Ashland Coal Company and Island Creek Coal Company. The major Kentucky coal supplier is Tennessee Consolidated Coal Company.

TABLE 9-8
TENNESSEE VALLEY AUTHORITY-KENTUCKY
COAL-FIRED GENERATING STATIONS AND STATISTICS
1986

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
PARADISE	* 1	1963	625.0	CY	COAL						
	* 2	1963	625.0	CY	COAL						
	3	1969	1,014.0	CY	COAL						
TOTAL			2,264.0			12,617,949	64	327	1.72	10,010	5,413,000

* Units 1 and 2 are equipped with FGD.

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	FGD REMOVAL %	SO2 LB/MMBTU
KENTUCKY	5,001.6	10,998	4.10	15.02	23.48	1.068		7.270
OHIO	56.0	10,716	4.42	15.89	24.10	1.124		8.043
TOTAL	5,057.6	10,998	4.10	15.02	23.48	1.068	84	4.436

TABLE 9-8 (CONTINUED)

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
SHAWNEE	1	1953	151.0	PC	COAL						
	2	1953	151.0	PC	COAL						
	3	1953	151.0	PC	COAL						
	4	1953	151.0	PC	COAL						
	5	1954	151.0	PC	COAL						
	6	1954	151.0	PC	COAL						
	7	1954	151.0	PC	COAL						
	8	1955	151.0	PC	COAL						
	9	1955	151.0	PC	COAL						
	10	1956	151.0	PC	COAL						
TOTAL			1,510.0			5,868,434	44	198	2.03	10,380	2,459,000

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
ILLINOIS	64.7	11,949	0.90	11.60	34.70	1.452	1.469
KENTUCKY	973.8	11,957	1.76	10.03	30.03	1.256	2.870
W. VIRGINIA	1,812.8	12,574	0.67	8.94	39.53	1.572	1.039
TOTAL	2,851.3	12,349	1.04	9.37	36.17	1.465	1.642

CHAPTER TEN

MINNESOTA

Minnesota electric utilities purchased approximately nine million tons of coal; 18 thousand barrels of petroleum; and one billion cubic feet of natural gas in 1986. Coal represented one percent of U.S. utility coal purchases, while petroleum and natural gas were only negligible. On a BTU basis, Minnesota utilities purchased one percent of the U.S. total. Table 10-1 lists the fossil-fuel sources for electric generation by Minnesota electric utilities.

TABLE 10-1. MINNESOTA FOSSIL-FUEL SOURCES FOR ELECTRIC GENERATION.

FUEL	QUANTITY (000)	BTU (BILLION)	% OF TOTAL	$/UNIT	$/MMBTU
COAL	9,324 tons	162,703	99.1	23.74	1.36
PETROLEUM	18 bls.	104	.1	16.12	2.60
NATURAL GAS	1,309 mmcf.	1,307	.8	2.95	2.95
TOTAL		164,114	100.0		

Minnesota has three investor-owned utilities, 125 municipal systems, 51 rural electric cooperatives and four state systems. The major suppliers of electricity are Minnesota Power and Light Company, Northern States Power Company and Otter Trail Power Company. These three utilities account for most of Minnesota's electrical generation.

Minnesota electric utilities have 7,859 megawatts of capability, representing one percent of the U.S. total. This capability consists of 4,360 megawatts of coal-fired; 1,550 megawatts of nuclear-fired; 1,116 megawatts of petroleum-fired; 695 megawatts of natural gas-fired; and 138 megawatts of hydro. Of the 44 states that have coal-fired generation, Minnesota ranks 23rd.

Table 10-2 provides a break down of the various fuel types by capability, number of units, percent of total capability and percent of U.S. total capability. The U.S. total is shown as the percent of Minnesota's fuel type to the U.S. total. For example, the 4,360 megawatts of coal capability represents two percent of the U.S. coal capability.

TABLE 10-2. MINNESOTA SUMMER CAPABILITY.

TYPE OF CAPABILITY	TOTAL	COAL	NUCLEAR	PETROLEUM	NATURAL GAS	WATER
MEGAWATTS	7,859	4,360	1,550	1,116	695	138
NO. OF UNITS	370	53	3	195	56	63
% OF MN TOTAL	100	55	20	14	9	2
% OF U.S. TOTAL	1	2	2	1	1	--

Northern States Power Company will add two new coal-fired stations in the near term. These stations are listed in Table 10-3.

TABLE 10-3. FUTURE BASELOAD CAPABILITY IN MINNESOTA.

UTILITY	STATION AND UNIT	CAPABILITY (MW)	FUEL	ON LINE
NORTHERN	Riverside 7	130	Coal	1987
STATES POWER	Sherburne 3*	739	Coal	1987
TOTAL		869		

* Jointly owned.

Net generation by Minnesota electric utilities totals 28,000 gigawatthours, a decrease of eight percent from 1985. This generation ranks Minnesota 32nd in nationwide electrical generation. Coal supplies 58 percent of the total, while nuclear generates 39 percent. On a national basis, Minnesota accounts for one percent of total generation. Table 10-4 details the types of generation.

TABLE 10-4. MINNESOTA NET GENERATION.

TYPE OF CAPABILITY	TOTAL	COAL	NUCLEAR	PETROLEUM	NATURAL GAS	WATER
GIGAWATTHOURS	28,401	16,267	11,052	22	124	936
% OF MN TOTAL	100	58	39	--	--	3
% OF U.S. TOTAL	1	1	3	--	--	--

In 1986, Minnesota purchased approximately nine million tons of coal. This coal is supplied by six coal producing states. The sulfur content varies from 0.3 percent to 1.6 percent, with a weighted average of 0.6 percent. The BTU content varies from 6,893 to 12,250 per pound of coal, with an average of 8,725. On a BTU cost basis, Wyoming coal has the lowest delivered price at $1.28 per million BTU, while Illinois coal is the most expensive at $2.11 per million BTU. Table 10-5 lists the various coal supplying states and their respective quantities and qualities of coal sold to Minnesota utilities.

TABLE 10-5. MINNESOTA COAL SUPPLIERS.

STATE/REGION	TONS (000)	% OF TOTAL	BTU/LB	% SULFUR	$/TON	$/MMBTU
MONTANA	6,138	66	8,638	.73	23.56	1.36
WYOMING	2,642	28	8,748	.30	22.30	1.28
N. DAKOTA	228	2	6,893	.82	24.22	1.76
INDIANA	140	2	10,937	1.40	30.11	1.38
ILLINOIS	113	1	12,250	1.62	51.64	2.11
W. KENTUCKY	63	1	11,649	1.29	35.68	1.53
TOTAL/AVERAGE	9,324	100	8,725	.63	23.74	1.36

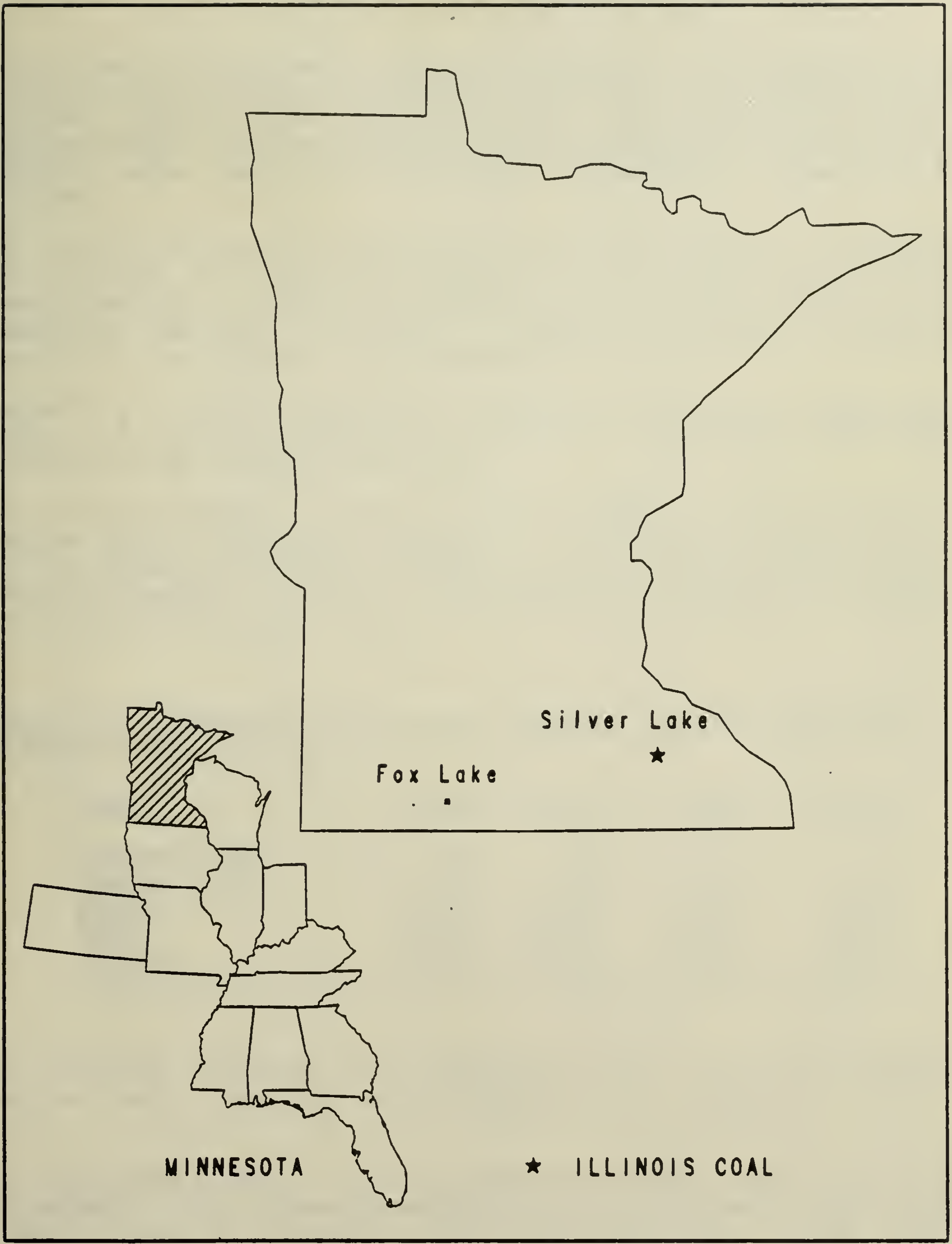
One Illinois coal supplier sold about 0.1 million tons of coal to the Rochester Department of Public Utilities in 1986. The Illinois coal sale represents about one percent of Minnesota's total utility coal receipts. The major coal supplying states were Montana and Wyoming with 94 percent of the total. Illinois coal sales, quality of coal and delivered prices to Minnesota, for the period 1981 through 1986 are shown in Table 10-6. Since 1982, Illinois coal sales to Minnesota have decreased by about 500 percent.

TABLE 10-6. MINNESOTA'S ILLINOIS COAL PURCHASES AND DELIVERED PRICES 1986-1981.

YEAR	1981	1982	1983	1984	1985	1986
THOUSAND TONS	509	577	312	100	175	113
PERCENT SULFUR	2.70	2.70	2.80	1.90	1.50	1.62
BTU/LB	11,594	11,560	11,506	12,342	12,196	12,250
$/TON	38.42	41.75	45.04	50.79	52.06	51.64
$/MMBTU	1.66	1.81	1.96	2.06	2.13	2.11

A discussion of the Rochester Department of Public Utilities follows. Map 10-1 shows the location of the Silver Lake coal-fired generating station. Also included in the map is Interstate Power Company's Fox Lake coal-fired generating station, which is discussed in Chapter Seven.

MAP 10-1
COAL FIRED GENERATING STATIONS



The Rochester Department of Public Utilities is a municipally-owned electric utility located in southeastern Minnesota. Rochester's service territory consists of the City of Rochester, with a population of 60,000. The department supplies electricity to approximately 29,000 customers. Electric sales are nearly 0.7 billion kilowatthours, valued at $42 million.

The utility has one coal-fired generating station located in Rochester. The department also has one gas turbine generator and one hydro unit. The total capability is rated at 136 megawatts. Of this total, the coal-fired capability represents 78 percent. Statewide, Rochester's capability accounts for two percent of total capability.

Rochester's electrical generation is about 0.3 billion kilowatthours. Almost all of this generation is from coal. Statewide, this figure accounts for one percent of the total.

The utility purchased 113,000 tons of coal in 1986. All of the coal is supplied by one Illinois coal producer. This figure also represents all of the Illinois coal demand in Minnesota and one percent of the state's total coal receipts. Table 10-7 lists Rochester's Illinois coal purchases for the past four years.

TABLE 10-7. **ROCHESTER'S ILLINOIS COAL PURCHASES, QUALITY OF COAL AND DELIVERED PRICES 1983-1986.**

YEAR	1983	1984	1985	1986
THOUSAND TONS	142	100	175	113
PERCENT SULFUR	2.15	1.90	1.50	1.62
BTU/LB	12,400	12.342	12,196	12,250
$/TON	50.52	50.79	52.06	51.64
$/MMBTU	2.04	2.06	2.13	2.11

The following paragraphs discuss Rochester's one coal-fired generating station. Refer to Map 10-1 for the location of this station.

The Silver Lake Station has four pulverized coal units with capability of 106 megawatts. This figure represents all of the departments's coal-fired capability and 78 percent of its total capability. Silver Lake's generation of 0.3 billion kilowatthours represents 33 percent of the station's capability. The average cost per kilowatthour of generation is 3.6 cents, with the fuel expense at 2.8 cents.

The station consumed 146,000 tons of Illinois coal in 1986. The coal averages 12,250 BTU per pound of coal and 1.6 percent sulfur. Silver Lake's SO2 emission rate is 2.4 pounds per million BTU of input. No information is available concerning the cost and likelihood of FGD retrofit. The Illinois coal is supplied by Sahara Coal Company under contract. The coal is received by railroad carrier. Table 10-8 furnishes additional data on the Rochester system.

TABLE 10-8
ROCHESTER DEPARTMENT OF PUBLIC UTILITIES
COAL-FIRED GENERATING STATION AND STATISTICS
1986

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
SILVER	1	1948	9.1	PC	COAL						
LAKE	2	1953	13.8	PC	COAL						
	3	1962	22.5	PC	COAL						
	4	1969	60.3	PC	COAL						
TOTAL			105.7			300,954	33	253	3.59	11,747	146,000

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
ILLINOIS	112.7	12,250	1.62	7.06	51.64	2.108	2.382

TOTAL CAPABILITY:	136 MEGAWATTS
COAL-FIRED CAPABILITY:	106 MEGAWATTS
TOTAL COAL PURCHASES:	112,700 TONS
ILLINOIS COAL PURCHASES:	112,700 TONS
TOTAL GENERATION:	0.3 BILLION KILOWATTHOURS
COAL-FIRED GENERATION:	0.3 BILLION KILOWATTHOURS

CHAPTER ELEVEN

MISSISSIPPI

Mississippi electric utilities purchased approximately four million tons of coal; two million barrels of petroleum; and 45 billion cubic feet of natural gas in 1986. Coal represented less than one percent of U.S. utility coal purchases, while natural gas accounted for two percent. On a BTU basis, Mississippi utilities purchased less than one percent of the U.S. total fuel receipts. Table 11-1 lists the fossil-fuel sources for electrical generation in Mississippi.

TABLE 11-1. MISSISSIPPI FOSSIL-FUEL SOURCES FOR ELECTRIC GENERATION.

FUEL	QUANTITY (000)	BTU (BILLION)	% OF TOTAL	$/UNIT	$/MMBTU
COAL	4,201 tons	102,734	63.8	56.11	2.29
PETROLEUM	1,920 bls.	12,082	7.5	13.40	2.13
NATURAL GAS	44,559 mmcf.	46,263	28.7	2.40	2.32
TOTAL		161,079	100.0		

Mississippi has two investor-owned utilities, 23 municipal systems, 26 rural electric cooperatives, one U.S. government system and one state system. The major suppliers of electricity are Mississippi Power Company, Mississippi Power and Light Company and Southern Mississippi Electric Power Association.

Mississippi electric utilities have 6,888 megawatts of capability, accounting for one percent of the U.S. total. This capability consists of 3,456 megawatts of natural gas-fired; 2,219 megawatts of coal-fired; 1,108 megawatts of nuclear-fired; and 105 megawatts of petroleum-fired. Of the 44 states that have coal-fired generation, Mississippi ranks 35th. Mississippi utilities have no near term plans of adding coal-fired generating capability. Table 11-2 details Mississippi's electric capability. As shown in the table, natural gas capability accounts for 50 percent of Mississippi's total capability.

TABLE 11-2. MISSISSIPPI SUMMER CAPABILITY.

TYPE OF CAPABILITY	TOTAL	COAL	NUCLEAR	PETROLEUM	NATURAL GAS
MEGAWATTS	6,888	2,219	1,108	105	3,456
NO. OF UNITS	50	9	1	5	35
% OF MS TOTAL	100	32	16	2	50
% OF U.S. TOTAL	1	1	1	--	4

Net generation by Mississippi electric utilities totals 19,000 gigawatthours. By energy source, coal supplies 52 percent of the total, while nuclear and natural gas supply 22 percent, each. On a national basis, Mississippi ranks 39th in electrical generation and accounts for less than one percent of total generation. For the U.S. total, coal and nuclear generate one percent, each. Table 11-3 details each category.

TABLE 11-3. MISSISSIPPI NET GENERATION.

TYPE OF CAPABILITY	TOTAL	COAL	NUCLEAR	PETROLEUM	NATURAL GAS
GIGAWATTHOURS	18,980	9,806	4,087	836	4,251
% OF MS TOTAL	100	52	22	4	22
% OF U.S. TOTAL	1	1	1	1	2

In 1986, Mississippi utilities purchased approximately four million tons of coal. This coal is supplied by eight coal producing states. The sulfur content varies from 0.5 percent to 2.5 percent, with a weighted average of 1.5 percent. The BTU content varies from 11,700 to 12,810 per pound of coal, with an average of 12,228. On a BTU cost basis, Ohio coal has the lowest delivered price at $1.74 per million BTU, while Utah coal is the most expensive at $3.31 per million BTU. Table 11-4 lists the various coal supplying states, or region, and their respective quantities and qualities of coal sold to Mississippi utilities.

TABLE 11-4. MISSISSIPPI COAL SUPPLIERS.

STATE/REGION	TONS (000)	% OF TOTAL	BTU/LB	% SULFUR	$/TON	$/MMBTU
E. KENTUCKY	1,060	25	12,502	1.23	51.56	2.06
COLORADO	1,048	25	11,700	.54	75.34	3.22
W. KENTUCKY	767	19	12,308	2.43	44.54	1.81
ILLINOIS	336	8	12,199	2.50	42.64	1.75
ALABAMA	287	6	12,416	2.40	45.28	1.82
W. VIRGINIA	275	7	12,695	1.71	47.93	1.89
UTAH	226	5	12,126	.52	80.21	3.31
OHIO	128	3	12,317	2.39	42.93	1.74
TENNESSEE	74	2	12,810	2.41	51.41	2.01
TOTAL/AVERAGE	4,201	100	12,228	1.51	56.11	2.29

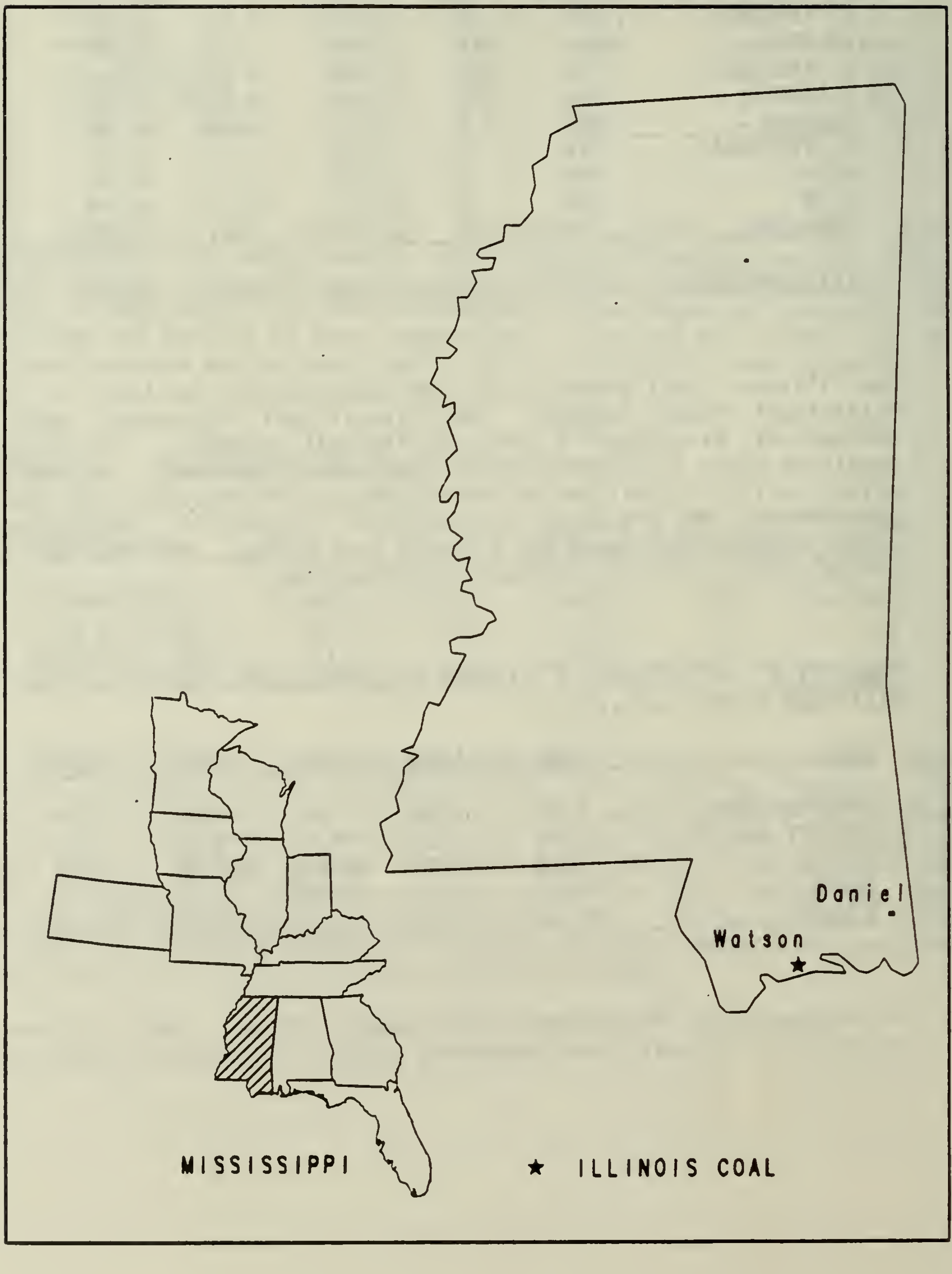
One Illinois coal producer supplies about 0.3 million tons of coal to Mississippi Power Company. The Illinois coal represents about eight percent of Mississippi's total utility coal receipts. The major coal supplying state is Kentucky with 44 percent of the total. Illinois coal sales, quality of coal and delivered prices to Mississippi, for the period 1981 through 1986 are shown in Table 11-5. Since 1981, Mississippi has almost doubled its demand for Illinois coal. Also, for this same period, the delivered price has increased by 11 percent.

TABLE 11-5. MISSISSIPPI'S ILLINOIS COAL PURCHASES, QUALITY OF COAL AND DELIVERED PRICES 1981-1986.

YEAR	1981	1982	1983	1984	1985	1986
THOUSAND TONS	187	292	147	236	173	336
PERCENT SULFUR	2.70	2.70	2.90	2.60	2.50	2.50
BTU/LB	12,385	12,203	12,420	12,058	11,999	12,199
$/TON	38.97	41.26	44.46	43.72	44.63	42.64
$/MMBTU	1.57	1.69	1.79	1.81	1.86	1.75

A discussion of Mississippi Power Company follows. Map 11-1 shows the location of the coal-fired generating stations discussed in this chapter.

MAP 11-1
COAL FIRED GENERATING STATIONS



MISSISSIPPI POWER COMPANY

Mississippi Power Company (MPC) headquartered in Gulfport, Mississippi, is an operating subsidiary of The Southern Company. MPC is involved in the generation, purchase and distribution of electricity to 170,000 customers in a portion of southeastern Mississippi. The service territory covers approximately 1,200 square miles and 23 counties, with a population of 0.8 million. The major economic activities consist of lumbering, manufacturing, shipping, fishery products and tourism. The company employs 1,800.

Electric sales are approximately 8.5 billion kilowatthours, with a value of $450 million. Total kilowatthours sold ranks MPC as the second largest Mississippi electric utility. Nationally, MPC's sales statistics are included in The Southern Company. The Southern Company is the largest investor-owned utility in the United States.

MPC has two coal-fired generating stations, located in the southeastern tip of Mississippi. MPC also owns 40 percent of Alabama Power Company's Greene County coal-fired station (204 megawatts), located near Demopolis, Alabama. MPC's total capability is 2,015 megawatts, with 1,811 megawatts located in Mississippi. The company's coal-fired capability totals 1,476 megawatts, with 1,272 megawatts located in Mississippi. MPC's coal-fired capability located in Mississippi represents 18 percent of the state's total capability.

MPC has 6,903 miles of above ground power lines. The company has electrical interconnections with the Southern Company, Mississippi Power and Light Company, Louisiana Power and Light Company and Gulf States Utilities Company.

MPC has electrical generation of nearly eight billion kilowatthours. Coal accounts for most of the total. Statewide, MPC's generation represents 40 percent of total generation.

MPC purchased 3.4 million tons of coal in 1986. Of this total, Illinois supplies 336,000 tons, or ten percent. All of the Illinois coal is used at MPC's Watson Station. The Illinois coal represents eight percent of the state's total utility coal receipts. Table 11-6 shows MPC's Illinois coal purchases for the past four years. Since 1983, MPC has increased its demand for Illinois coal by about 0.2 million tons, while the delivered price has fallen by $.04 per million BTU.

TABLE 11-6. MPC'S ILLINOIS COAL PURCHASES, QUALITY OF COAL AND DELIVERED PRICES 1983-1986.

YEAR	1983	1984	1985	1986
THOUSAND TONS	147	236	173	336
PERCENT SULFUR	2.91	2.56	2.49	2.50
BTU/LB	12,420	12,058	11,999	12,199
$/TON	44.46	43.72	44.63	42.64
$/MMBTU	1.79	1.81	1.86	1.75

The following paragraphs discuss MPC'S two coal-fired stations located in Mississippi. Table 11-7, at the end of this narrative, provides statistics on these stations. Refer to Map 11-1 for the locations of these stations.

The Jack Watson Station is located in southeastern Mississippi at Gulfport. The Watson Station consists of two pulverized coal units with capability of 763 megawatts. The station accounts for 38 percent of MPC's total capability. The station's generation of 4.1 billion kilowatthours, represents 62 percent of its capability and 53 percent of MPC's total generation. The average production expense per kilowatthour of generation is 2.4 cents, with the fuel expense at two cents. It is the most efficient of MPC's two coal-fired stations.

The 1.7 million tons of coal used in 1986 averages 12,330 BTU per pound of coal and 2.4 percent sulfur. SO2 emissions are 3.8 pounds per million BTU of input. Nationally, the station is ranked 77th in total tons of SO2 emissions. Unit 5 is rated easy for FGD retrofit because of age, size and availability of space. Unit 4 is rated difficult because of space constraints. The coal is supplied by six coal producing states. The Illinois coal is supplied by Peabody Coal Company under contract. The coal is received by railroad and barge. Other major coal suppliers are Island Creek Coal Company by contract; Federal Mining/Waterloo Coal Company by spot market; and Jim Smith Contracting Company by spot market.

The Victor Daniel Station is located at the southeastern tip of Mississippi at Escatawpa. The station has two pulverized coal units with capability of 1,019 megawatts. The station is operated by MPC and jointly owned with Gulf Power Company (50% each). Daniel accounts for 51 percent of MPC's total capability. The station's generation of 3.7 billion kilowatthours represents 42 percent of its capability. Of this total, MPC's share is 1.9 billion kilowatthours. This figure accounts for 25 percent of the company's total generation. The production expense averages 3.7 cents per kilowatthour of generation. The fuel expense averages 3.4 cents per kilowatthour of generation.

The 1.6 million tons of coal burned at the Victor Daniel Station averages 11,898 BTU per pound of coal and 0.6 percent sulfur. Both units are using a compliance coal to meet the U.S. Environmental Protection Agency's New Source Performance Standard. SO2 emissions are 0.9 pound per million BTU of heat input. The coal is supplied by Colorado, Utah and West Virginia coal producers. Major coal suppliers are Beaver Creek Coal Company by contract; Eastern Associated Coal Corporation by spot market; Powderhorn Coal Company by contract; and West Elk Coal Company by contract.

TABLE 11-7
MISSISSIPPI POWER COMPANY
COAL-FIRED GENERATING STATIONS AND STATISTICS
1986

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
JACK	4	1968	262.6	PC	COAL						
WATSON	5	1973	500.0	PC	COAL						
TOTAL			762.6			4,129,789	62	179	2.36	10,395	1,744,000

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
ALABAMA	287.1	12,416	2.40	10.79	45.28	1.824	3.769
ILLINOIS	335.5	12,199	2.50	8.51	42.64	1.748	3.996
KENTUCKY	1,003.5	12,325	2.41	7.36	44.45	1.803	3.813
OHIO	128.3	12,317	2.39	9.69	42.93	1.743	3.784
TENNESSEE	74.3	12,810	2.41	9.47	51.41	2.007	3.669
W. VIRGINIA	169.7	12,272	2.32	6.74	45.27	1.844	3.686
TOTAL	1,998.4	12,330	2.41	8.22	44.50	1.804	3.811

TABLE 11-7 (CONTINUED)

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
VICTOR	* 1	1977	509.5	PC	COAL						
DANIEL	* 2	1981	509.5	PC	COAL						
TOTAL			1,019.0			3,725,134	42	374	3.71	10,379	1,639,000

* The Company owns 50% of the station.

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
COLORADO	1,047.8	11,700	0.54	7.85	75.34	3.220	0.900
UTAH	226.4	12,126	0.52	8.47	80.21	3.307	0.836
W. VIRGINIA	104.7	13,380	0.72	5.95	52.25	1.953	1.049
TOTAL	1,378.9	11,898	0.55	7.81	74.39	3.126	0.901

TOTAL CAPABILITY:	2,015 MEGAWATTS
COAL-FIRED CAPABILITY:	1,476 MEGAWATTS
TOTAL COAL PURCHASES:	3,377,400 TONS
ILLINOIS COAL PURCHASES:	335,000 TONS
TOTAL GENERATION:	7.7 BILLION KILOWATTHOURS
COAL-FIRED GENERATION:	7.1 BILLION KILOWATTHOURS

CHAPTER TWELVE

MISSOURI

Missouri electric utilities purchased approximately 21 million tons of coal; 0.3 million barrels of petroleum; and 0.7 billion cubic feet of natural gas in 1986. For these categories, coal represented three percent of U.S. utility coal purchases, while petroleum and natural gas were only negligible. On a BTU basis, Missouri utilities purchased two percent of the U.S. utility receipts for electrical generation. Table 12-1 lists the fossil-fuel sources for Missouri electric utilities during 1986. For the fossil-fuel categories, almost all of the total is derived from coal.

TABLE 12-1. MISSOURI FOSSIL-FUEL SOURCES FOR ELECTRIC GENERATION.

FUEL	QUANTITY (000)	BTU (BILLION)	% OF TOTAL	$/UNIT	$/MMBTU
COAL	21,241 tons	454,075	99.4	31.35	1.47
PETROLEUM	305 bls.	1,892	.4	16.12	2.60
NATURAL GAS	749 mmcf.	736	.2	2.87	2.92
TOTAL		456,703	100.0		

Missouri has five investor-owned utilities, 82 municipal systems, 47 rural electric cooperatives and one state system. The major suppliers of electricity are Union Electric Company, Associated Electric Cooperative Incorporated, Kansas City Power and Light Company and Utilicorp United Incorporated, formerly Missouri Public Service Company. These four utilities account for over 95 percent of Missouri's electrical generation, with about 60 percent of the total generation by Union Electric Company.

Missouri's electric utilities have 14,916 megawatts of capability, representing two percent of the U.S. total. This capability consists of 10,631 megawatts of coal-fired; 1,392 megawatts of petroleum-fired; 1,109 megawatts of nuclear-fired; 1,062 megawatts of water; and 722 megawatts of natural gas-fired. Of the 44 states that have coal-fired generation, Missouri ranks 11th.

Table 12-2 breaks down the various fuel types by capability, number of units, percent of Missouri's total capability and percent of U.S. total capability. For example, the 1,109 megawatts of Missouri nuclear capability represents seven percent of Missouri's total capability and one percent of the total U.S. nuclear capability.

TABLE 12-2. MISSOURI SUMMER CAPABILITY.

TYPE OF CAPABILITY	TOTAL	COAL	NUCLEAR	PETROLEUM	NATURAL GAS	WATER
MEGAWATTS	14,916	10,631	1,109	1,392	722	1,062
NO. OF UNITS	337	50	1	172	85	29
% OF MO TOTAL	100	72	7	9	5	7
% OF U.S. TOTAL	2	4	1	2	1	1

Associated Electric Cooperative, Inc. has plans of adding one coal-fired unit in the future. Table 12-3 details this generating station.

TABLE 12-3. FUTURE BASELOAD CAPABILITY IN MISSOURI.

UTILITY	STATION AND UNIT	CAPABILITY (MW)	FUEL	ON LINE
ASSOCIATED ELECTRIC COOP.	Watson 1	584	Coal	1997

Net generation by Missouri electric utilities totals 54 thousand gigawatthours, a decrease of five percent from 1985. This generation ranks Missouri as the 18th largest electric producer in the nation. Coal-fired generation accounts for 83 percent of the total, with most of the balance from nuclear generation. Missouri electric utilities account for two percent of the U.S. total generation. Table 12-4 lists Missouri's generation by fuel type.

TABLE 12-4. MISSOURI NET GENERATION.

TYPE OF CAPABILITY	TOTAL	COAL	NUCLEAR	PETROLEUM	NATURAL GAS	WATER
GIGAWATTHOURS	54,201	44,856	7,170	100	79	1,996
% OF MO TOTAL	100	83	13	--	--	4
% OF U.S. TOTAL	2	3	2	--	--	1

Missouri electric utilities purchased approximately 21 million tons of coal in 1986. The coal is supplied by seven coal producing states. The sulfur content varies from 0.3 percent to 4.4 percent, with a weighted average of 2.5 percent. The BTU content varies from 8,723 to 12,577 per pound of coal, with an average of 10,689. On a BTU cost basis, Wyoming coal has the lowest delivered price at $.91 per million BTU, while Illinois coal is the most expensive at $1.59 per million BTU. Table 12-5 lists the various coal supplying states and their respective quantities and qualities of coal sold to Missouri. As shown in the table, Illinois coal producers supply over 60 percent of the coal receipts in Missouri.

TABLE 12-5. MISSOURI COAL SUPPLIERS.

STATE/REGION	TONS (000)	% OF TOTAL	BTU/LB	% SULFUR	$/TON	$/MMBTU
ILLINOIS	12,854	61	11,139	2.37	35.46	1.59
MISSOURI	3,832	18	10,403	4.44	31.32	1.51
WYOMING	3,383	16	8,723	.34	15.85	.91
OKLAHOMA	881	4	12,577	3.93	31.03	1.23
KANSAS	167	1	12,065	3.73	34.55	1.43
W. KENTUCKY	63	--	11,155	3.04	24.23	1.09
INDIANA	61	--	11,100	1.20	28.84	1.30
TOTAL/AVERAGE	21,241	100	10,689	2.50	31.35	1.47

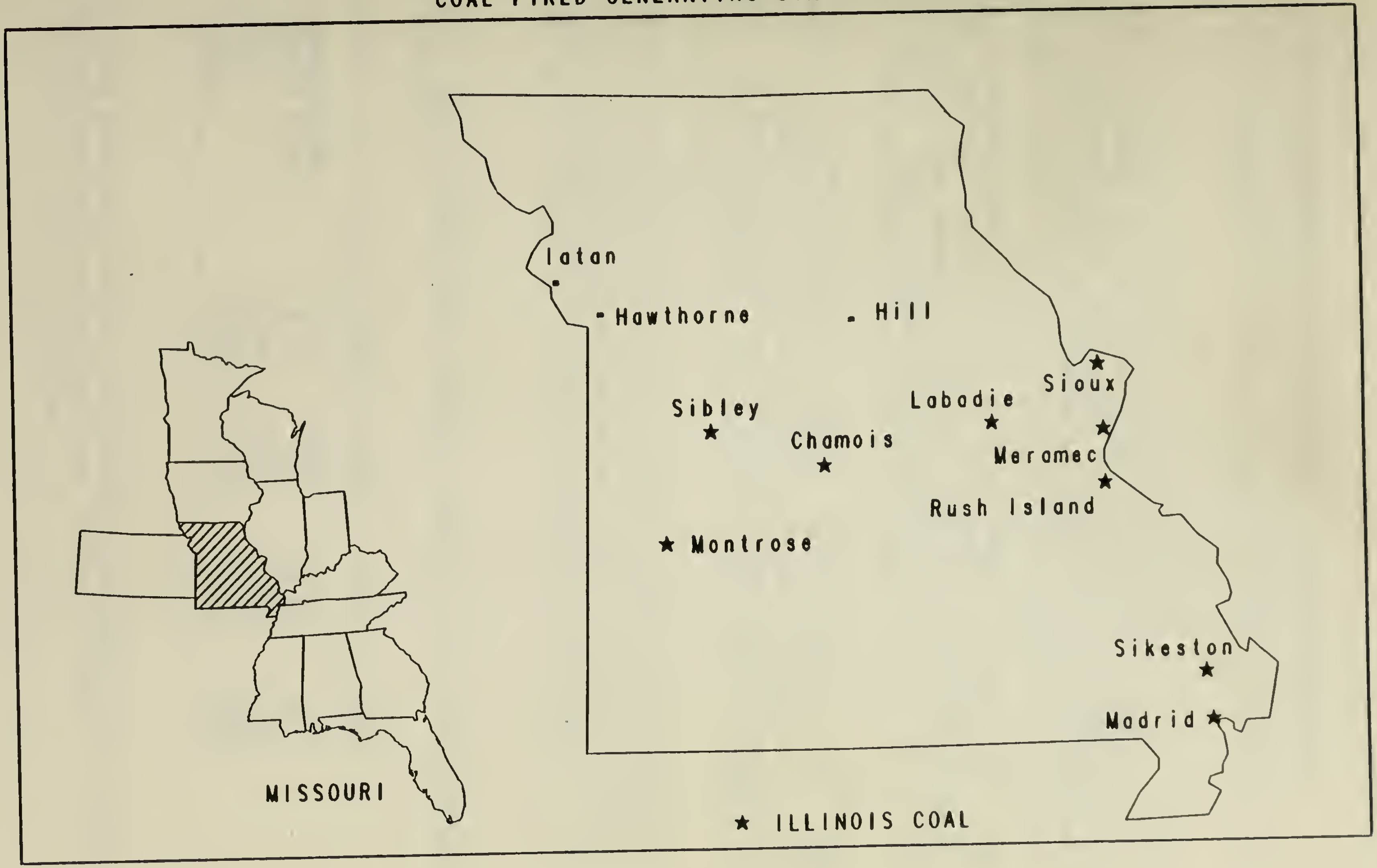
Illinois coal producers sold nearly 13 million tons of coal to six Missouri electric utilities in 1986. These coal sales rank Missouri second in Illinois coal receipts. Illinois coal sales are with Union Electric Company, Associated Electric Cooperative Incorporated, Utilicorp United Incorporated, Central Electric Power Cooperative, Sikeston Board of Municipal Utilities and Kansas City Power and Light Company. Illinois coal sales, quality of coal and delivered prices to Missouri, for the last six years are shown in Table 12-6. Since 1981, Missouri coal receipts have varied from 12 to almost 16 million tons, with an 18 percent increase in the delivered price since 1981.

TABLE 12-6. MISSOURI'S ILLINOIS COAL PURCHASES, QUALITY OF COAL AND DELIVERED PRICES 1981-1986.

YEAR	1981	1982	1983	1984	1985	1986
THOUSAND TONS	12,069	14,687	14,554	15,811	13,571	12,854
PERCENT SULFUR	2.50	2.40	2.40	2.40	2.30	2.37
BTU/LB	10,979	11,026	11,090	11,144	11,111	11,139
$/TON	28.29	31.15	33.00	34.05	34.88	35.46
$/MMBTU	1.35	1.42	1.49	1.53	1.57	1.59

A discussion of the six Missouri utilities that consume Illinois coal follows. Map 12-1 shows the location of the coal-fired powerplants discussed in this section.

MAP 12-1
COAL FIRED GENERATING STATIONS



ASSOCIATED ELECTRIC COOPERATIVE, INCORPORATED

Associated Electric Cooperative Incorporated (AEC) is an electric cooperative involved in the generation and sale of electricity in Missouri. AEC wholesales electricity to a number of cooperatives in Missouri. Electric sales are approximately eight billion kilowatthours, valued at $0.4 billion. AEC is headquartered in Springfield, Missouri.

AEC has interconnections with Union Electric Company, Kansas City Power and Light Company, Public Service of Oklahoma, Southwestern Power Administration, Iowa Southern Utilities, Kansas Gas and Electric Company, Missouri Public Service Company, Empire District Electric, St. Joseph Light and Power and Arkansas Power and Light Company.

AEC has two coal-fired generating stations, located in north central and southeastern Missouri. These stations have capability of 1,660 megawatts, representing 11 percent of Missouri's total capability. AEC's generation of about eight billion kilowatthours represents 14 percent of Missouri's total generation. AEC is the third largest producer of electricity in Missouri.

AEC purchased 4.6 million tons of coal in 1986. This coal is supplied by Illinois and Missouri coal producers, with Illinois supplying 46 percent of the total. Since 1983, AEC has decreased its Illinois coal receipts by 22 percent, while the delivered price has fallen by ten percent. Table 12-7 lists AEC's Illinois coal purchases for the past four years.

TABLE 12-7. AEC'S ILLINOIS COAL PURCHASES, QUALITY OF COAL AND DELIVERED PRICES 1983-1986.

YEAR	1983	1984	1985	1986
THOUSAND TONS	2,701	2,955	2,492	2,101
PERCENT SULFUR	3.17	3.27	3.19	3.41
BTU/LB	10,754	10,751	10,802	10,901
$/TON	31.88	31.78	32.41	29.54
$/MMBTU	1.49	1.47	1.50	1.34

The following paragraphs discuss the two coal-fired generating stations. Table 12-8 provides additional data on these stations. Refer to Map 12-1 for the locations of these two stations.

The Hill Station is located in Randolph County at Clifton Hill. It consists of two cyclone units and one pulverized coal unit with capability of 1,080 megawatts. The station represents 63 percent of AEC's total capability. Hills' generation of 5.5 billion kilowatthours represents 58 percent of its capability and accounts for 72 percent of AEC's total generation. No figure is available on the cost per kilowatthour of generation. The fuel expense is 1.7 cents per kilowatthour of generation.

The station burned 2.7 million tons of Missouri coal in 1986. The coal averages 10,527 BTU per pound of coal and 4.2 percent sulfur. The Missouri coal is supplied by Associated Electric Cooperative Incorporated (captive mine) and Nemo Coal Incorporated, by contract.

Unit 3 has a limestone FGD system designed to remove up to 90 percent of the SO2 emissions. Unit 3 must meet the U.S. Environmental. Protection Agency's New Source Performance Standard. Overall, the station has a 3.9 pounds per million BTU of input SO2 emission rate. Nationally, Hill is ranked 32nd in total tons of SO2 emissions. Units 1 and 2 are rated modest for FGD retrofit.

The New Madrid Station is located in southeastern Missouri at New Madrid. It consists of two cyclone-fired units with total capability of 1,160 megawatts. Both units are identical in size. The station is operated by AEC, but Unit 1 is owned by the City of New Madrid. The unit owned by AEC represents 34 percent of AEC's total capability. The 4.3 billion kilowatthours generated by the station represents 42 percent of its capability. No figure is available on the cost per kilowatthour of generation. The fuel expense averages 1.3 cents per kilowatthour of generation.

The station burned two million tons of Illinois coal in 1986. The coal averages 10,901 BTU per pound of coal and 3.4 percent sulfur. The SO2 emission rate is 6.1 pounds per million BTU of input. Nationally, the station is ranked 15th in total tons of SO2 emissions. New Madrid is rated modest for FGD retrofit. The Illinois coal is supplied by Peabody Coal Company under contract through 1989. The coal is received by railroad and barge.

TABLE 12-8
ASSOCIATED ELECTRIC COOPERATIVE, INC
COAL-FIRED GENERATING STATIONS AND STATISTICS
1986

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
HILL	1	1966	175.0	CY	COAL						
	2	1969	275.0	CY	COAL						
	* 3	1982	630.0	PC	COAL						
			1,080.0			5,470,391	58	N.A.	N.A.	10,450	2,715,000

* Unit 3 is equipped with FGD.

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	FGD REMOVAL (%)	SO2 LB/MMBTU
MISSOURI	2,512.3	10,527	4.18	10.16	33.42	1.587	90	3.948

TABLE 12-8 (CONTINUED)

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
NEW MADRID	** 1	1972	580.0	CY	COAL						
	2	1977	580.0	CY	COAL						
TOTAL			1,160.0			4,294,921	42	N.A.	N.A.	9,950	1,960,000

** Unit 1 is owned by the City of New Madrid.

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
ILLINOIS	2,100.9	10,901	3.41	10.41	29.54	1.335	6.100

TOTAL CAPABILITY:	1,705 MEGAWATTS
COAL-FIRED CAPABILITY	1,660 MEGAWATTS
TOTAL COAL PURCHASES:	4,613,200 TONS
ILLINOIS COAL PURCHASES:	2,100,900 TONS
TOTAL GENERATION:	7.6 BILLION KILOWATTHOURS
COAL-FIRED GENERATION:	7.6 BILLION KILOWATTHOURS

CENTRAL ELECTRIC POWER COOPERATIVE

Central Electric Power Cooperative, Incorporated (CEPC) is an electric cooperative involved in the generation and sale of electricity in central Missouri. CEPC's electric customers consist of eight cooperatives and four wholesale customers. CEPC also purchases electricity from Associated Electric Cooperative Incorporated. Electric sales are approximately 1.4 billion kilowatthours, valued at $98 million. CEPC is headquartered in Jefferson City, Missouri.

CEPC has one coal-fired generating station, located in east central Missouri. The station's capability of 66 megawatts, represents less than one percent of Missouri's total capability. CEPC has generation of nearly 0.2 billion kilowatthours, which represents a minimal amount of Missouri's total generation.

CEPC purchased 63,000 tons of coal in 1986. The coal is supplied by one Illinois coal producer. CEPC's Illinois coal purchase accounts for less than one/half percent of all utility coal receipts in Missouri. Table 12-9 lists CEPC's Illinois coal purchases for the past three years. CEPC did not purchase any Illinois coal in 1983. Since 1984, the co-op has decreased its Illinois coal demand by 46 percent, while the delivered price has fallen by 25 percent.

TABLE 12-9. CEPC'S ILLINOIS COAL PURCHASES, QUALITY OF COAL AND DELIVERED PRICES 1984-1986.

YEAR	1984	1985	1986
THOUSAND TONS	122	71	66
PERCENT SULFUR	2.74	2.26	2.94
BTU/LB	11,022	11,915	11,065
$/TON	33.12	28.68	24.89
$/MMBTU	1.50	1.20	1.13

The following paragraphs discuss CEPC's one coal-fired station. Table 12-10, at the end of the narrative, provides additional data on the station and CEPC system. Refer to Map 12-1 for the location of this station.

The Chamois Station has one pulverized coal unit and one cyclone unit with capability of 66 megawatts. It is the only station that CEPC owns. Generation of 0.2 billion kilowatthours represents 37 percent of its capability. The cost per kilowatthour is 2.5 cents, with the fuel expense at 1.2 cents.

The station burned 103,000 tons of Illinois coal in 1986. The coal averages 11,065 BTU per pound of coal and 2.9 percent sulfur. SO2 emissions are 5.2 pounds per million BTU of input. No information is available concerning the cost consideration and likelihood for FGD retrofit. The Illinois coal is supplied by Zeigler Coal Company, by spot market, and received by railroad and barge.

TABLE 12-10
CENTRAL ELECTRIC POWER COOPERATIVE
COAL-FIRED GENERATING STATION AND STATISTICS
1986

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA- BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
CHAMOIS	1	1953	17.0	PC	COAL						
	2	1960	49.0	CY	COAL						
TOTAL			66.0			214,881	37	N.A.	2.54	10,608	103,000

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
ILLINOIS	63.0	11,065	2.94	10.36	24.89	1.125	5.181

TOTAL CAPABILITY:	66 MEGAWATTS
COAL-FIRED CAPABILITY:	66 MEGAWATTS
TOTAL COAL PURCHASES:	63,000 TONS
ILLINOIS COAL PURCHASES:	63,000 TONS
TOTAL GENERATION:	0.2 BILLION KILOWATTHOURS
COAL-FIRED GENERATION:	0.2 BILLION KILOWATTHOURS

KANSAS CITY POWER AND LIGHT COMPANY

Kansas City Power and Light Company (KCPL) is an investor-owned utility involved in the generation and sale of electricity in western Missouri and eastern Kansas. KCPL's service territory consists of 477 square miles in 23 counties, with a population of 0.9 million. Seventy percent of the sales are in Missouri. KCPL serves about 378 thousand electric customers. The Company also sells steam to downtown Kansas City businesses. Agri-business, aircraft systems manufacturing, and automobile and truck manufacturing are the more important economic activities in its service territory. The company employs about 3,000. Kansas City Power and Light Company is headquartered in Kansas City, Missouri.

Electric sales are approximately 9.3 billion kilowatthours, with a value of $651 million. Based on sales, KCPL is the second largest Missouri electric utility and the 58th largest, nationally.

KCPL has three coal-fired generating stations, located in western Missouri and one station located in eastern Kansas. These four stations have a capability of 2,037 megawatts, representing 69 percent of KCPL's total capability. For the portion of capability located in Missouri, it represents nine percent of statewide capability. KCPL also owns 42 percent of Kansas Gas and Electric Company's Wolf Creek nuclear station located in Kansas. KCPL's portion of the nuclear facility is 525 megawatts.

KCPL has 10,444 miles of above ground power lines and 1,366 miles of underground lines. KCPL has interconnections with Union Electric Company, Kansas Gas and Electric Company, Kansas Power and Light Company, St Joseph Light and Power Company, City of Kansas City, Kansas, Associated Electric Cooperative, Missouri Public Service Company, Interstate Power Company, Northern States Power Company and Iowa Public Service Company.

Kansas City Power and Light Company's generation is about 12 billion kilowatthours. Coal-fired generation accounts for 72 percent of the total. KCPL's Missouri generation accounts for 12 percent of statewide generation.

KCPL purchased 7.3 million tons of coal in 1986. Illinois coal accounts for a small portion of the total. Statewide, KCPL's Illinois coal demand represents less than one/half percent of all coal receipts. Table 12-11 details KCPL's Illinois coal purchase for 1986. For the period of this study, KCPL had no previous demand for Illinois coal.

TABLE 12-11. KCPL'S ILLINOIS COAL PURCHASE, QUALITY OF COAL AND DELIVERED PRICE 1986.

YEAR	1986
THOUSAND TONS	43
PERCENT SULFUR	3.85
BTU/LB	10,896
$/TON	29.81
$/MMBTU	1.37

The following paragraphs detail KCPL's four coal-fired generating stations. Table 12-12 provides additional data on these stations. Map 12-1 shows the locations of the stations in Missouri. For the location of the LaCygne Station refer to Map 8-1 under Kansas.

The Hawthorne Station is located in Kansas City, Missouri. It has one pulverized coal unit with capability of 450 megawatts and represents 15 percent of KCPL's total capability. The station's generation of two billion kilowatthours represents 51 percent of its capability and 17 percent of the company's total generation. The production cost per kilowatthour is not available. The fuel expense is one cent per kilowatthour.

Almost 1.4 million tons of Wyoming coal were consumed in 1986. The coal averages 8,509 BTU per pound of coal and 0.3 percent sulfur. The station has an SO2 emission rate of 0.8 pound per million BTU of input. The Wyoming coal is supplied by Cordero Mining Company by spot market and Rochelle Coal Company, by contract. Only a small portion of Oklahoma coal is used.

The Iatan Station is located in northwestern Missouri near Weston. The one pulverized coal unit is relatively new and rated at 670 megawatts. KCPL owns 70 percent of the station (469 megawatts). The portion owned by KCPL accounts for 16 percent of KCPL's total capability. Generation of four billion kilowatthours represents 68 percent of its capability and 23 percent of KCPL's total generation. It is the most efficient KCPL station, with a production expense of 1.3 cents per kilowatthour. Of this total, the fuel expense is one cent per kilowatthour.

The station consumed 2.3 million tons of Wyoming coal in 1986. The coal averages 8,865 BTU per pound of coal and 0.4 percent sulfur. SO2 emissions are 0.8 pound per million BTU of input. The station must meet the U.S. Environmental Protection Agency's New Source Performance Standard. The Wyoming compliance coal is supplied by Thunder Basin Coal Company by contract through 2003.

The LaCygne Station consists of one pulverized coal unit and one cyclone unit with 1,316 megawatts of capability. KCPL owns 50 percent of the facility, or 658 megawatts. This figure accounts for 22 percent of KCPL's total capability. The station is located in LaCygne, Kansas. LaCygne's generation of 4.5 billion kilowatthours, represents 39 percent of its capability, while the amount owned by the company (2.3 billion kilowatthours) represents 19 percent of KCPL's total generation. It is the least efficient station for which data is available. The production expense is 2.5 cents per kilowatthour, with the fuel expense at 1.7 cents.

LaCygne consumed three million tons of Kansas, Missouri and Wyoming coal in 1986. The coal averages 8,811 BTU per pound of coal, with 2.5 percent sulfur. The Wyoming coal is supplied by Amax Coal Company by contract through 1996. The Kansas and Missouri coal is supplied by Pittsburgh and Midway Coal Company.

Unit 1 is equipped with a limestone FGD system. The system is capable of removing up to 80 percent of the SO2. No figures are available on the capital cost or operating expense of the system. Overall, the station has an SO2 emission rate of 1.5 pounds per million BTU of input. Nationally, LaCygne is ranked 132nd in total tons of SO2 emissions. No information is available concerning the cost consideration of FGD retrofit for Unit 2.

The Montrose Station is located in Clinton, Missouri. The station has three pulverized coal units, with capability of 460 megawatts. The station accounts for 16 percent of KCPL's total capability. Its 1.7 billion kilowatthours of generation accounts for 42 percent of its capability and 14 percent of KCPL's total generation. Montrose is the second most efficient plant with a production expense of 2.2 cents per kilowatthour. The fuel expense averages 1.6 cents per kilowatthour.

The one million tons of Illinois, Missouri and Oklahoma coal consumed in 1986 averages 9,885 BTU per pound of coal and 4.2 percent sulfur. SO2 emissions are 8.3 pounds per million BTU of input. Nationally, Montrose is ranked 23rd in total tons of SO2 emissions. The station is rated very difficult for FGD retrofit because of age, size and limited space. The Illinois coal is received by rail and supplied by Peabody Coal Company under contract and spot market. The Missouri and Oklahoma coal is also supplied by Peabody Coal Company through contract.

TABLE 12-12
KANSAS CITY POWER AND LIGHT COMPANY
COAL-FIRED GENERATING STATIONS AND STATISTICS
1986

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
HAWTHORNE	5	1969	450.0	PC	COAL	2,022,179	51	N.A.	N.A.	11,442	1,361,000

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	S02 LB/MMBTU
OKLAHOMA	3.7	12,581	5.04	12.50	33.06	1.314	7.812
WYOMING	1,299.1	8,498	0.33	5.29	15.13	0.890	0.757
TOTAL	1,302.8	8,509	0.34	5.31	15.18	0.892	0.779

TABLE 12-12 (CONTINUED)

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
IATAN	* 1	1980	670.0	PC	COAL	3,974,580	68	462	1.27	9,771	2,274,000

* The Company owns 70% of the station.

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
WYOMING	2,045.4	8,865	0.35	4.85	15.98	0.902	0.770

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
LACYGNE	* 1	1973	686.0	CY	COAL						
	* 2	1977	630.0	PC	COAL						
TOTAL			1,316.0			4,515,673	39	302	2.47	11,769	3,023,000

* The Company owns 50% of the station and unit 1 is equipped with FGD.

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	REMOVAL (%)	SO2 LB/MMBTU
KANSAS	953.2	9,237	5.08	25.90	22.05	1.193		10.724
MISSOURI	459.9	9,249	5.07	25.84	22.01	1.190		10.689
WYOMING	1,653.7	8,444	0.34	4.82	19.96	1.182		0.785
TOTAL	3,066.8	8,811	2.52	14.53	20.92	1.187	80	1.486

TABLE 12-12 (CONTINUED)

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
MONTROSE	1	1958	150.0	PC	COAL						
	2	1960	150.0	PC	COAL						
	3	1964	160.0	PC	COAL						
TOTAL			460.0			1,670,580	41.5	130	2.21	11,013	948,000

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
ILLINOIS	42.6	10,896	3.85	19.03	29.81	1.368	6.890
MISSOURI	747.9	9,685	4.49	22.20	27.02	1.395	9.040
OKLAHOMA	54.1	11,851	3.78	12.57	30.73	1.297	6.220
TOTAL	844.6	9,885	4.23	21.43	27.40	1.386	8.344

TOTAL CAPABILITY:	2,932 MEGAWATTS
COAL-FIRED CAPABILITY:	2,037 MEGAWATTS
TOTAL COAL PURCHASES:	7,259,600 TONS
ILLINOIS COAL PURCHASES:	42,600 TONS
TOTAL GENERATION:	12.1 BILLION KILOWATTHOURS
COAL-FIRED GENERATION:	8.7 BILLION KILOWATTHOURS

SIKESTON BOARD OF MUNICIPAL UTILITIES

The Sikeston Board of Municipal Utilities is a municipally-owned utility involved in the generation and sale of electricity and water in Sikeston, Missouri. Sikeston's service territory has a population of about 18,000. Electric sales are about 0.2 billion kilowatthours, valued at ten million dollars.

The Sikeston Board has one coal-fired generating station, located in Sikeston. The station's capability of 212 megawatts represents 96 percent of the utility's capability and one percent of Missouri's total capability. The utility's generation of 0.9 billion kilowatthours, represents two percent of Missouri's total generation.

The Board purchased 0.3 million tons of coal in 1986. Illinois supplies 250,000 tons, or 83 percent of the total. Sikeston's Illinois coal purchase represents one percent of Missouri's utility coal receipts and two percent of Illinois coal receipts. Table 12-13 lists Sikeston's Illinois coal purchases for the past four years. As shown, the Sikeston Board has reduced its Illinois coal demand by 64 percent, while the delivered price has fallen by 27 percent.

TABLE 12-13. **SIKESTON'S ILLINOIS COAL PURCHASES, QUALITY OF COAL AND DELIVERED PRICES 1983-1986.**

YEAR	1983	1984	1985	1986
THOUSAND TONS	667	659	277	242
PERCENT SULFUR	2.60	2.61	2.53	2.48
BTU/LB	11,368	11,367	11,176	11,211
$/TON	41.51	43.88	43.14	29.79
$/MMBTU	1.83	1.93	1.93	1.33

The following paragraphs discuss the Sikeston's one coal-fired station. Table 12-14 provides additional data on the station. Map 12-1 shows the location of the facility.

The Sikeston Station has one relatively new pulverized coal unit with capability of 212 megawatts. It is the only coal-fired station that the utility owns. Generation of 0.9 billion kilowatthours represents 46 percent of the station's capability. The cost per kilowatthour is not available. The fuel expense averages 1.4 cents per kilowatthour of generation.

The station consumed 0.4 million tons of Illinois and Kentucky coal in 1986. The coal averages 11,198 BTU per pound of coal and 2.6 percent sulfur. The Illinois coal is supplied by Old Ben Coal Company, Kenellis Energy Incorporated and Midwest Mining Company, all by contract. The coal is received by railroad. The Kentucky coal is supplied by Pyro Mining Company by contract.

The station is equipped with a limestone FGD system to meet the U.S. Environmental Protection Agency's New Source Performance Standard. No figures are available on the capital cost of the system or its operating expense. The system is rated to remove up to 80 percent of the SO2 emissions. The SO2 emissions are 1.2 pounds per million BTU of input.

TABLE 12-14
SIKESTON BOARD OF MUNICIPAL UTILITIES
COAL-FIRED GENERATING STATION AND STATISTICS
1986

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
SIKESTON	* 1	1981	212.0	PC	COAL	856,651	46	N.A.	N.A.	11,137	426,000

* Unit 1 is equipped with FGD.

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	FGD REMOVAL (%)	SO2 LB/MMBTU
ILLINOIS	241.6	11,211	2.48	11.52	29.79	1.329		4.314
KENTUCKY	61.9	11,148	3.05	11.44	24.08	1.080		5.335
TOTAL	303.5	11,198	2.59	11.50	28.63	1.278	80	1.200

TOTAL CAPABILITY: 221 MEGAWATTS
COAL-FIRED CAPABILITY: 212 MEGAWATTS
TOTAL COAL PURCHASES: 303,500 TONS
ILLINOIS COAL PURCHASES: 241,600 TONS
TOTAL GENERATION: 0.9 BILLION KILOWATTHOURS
COAL-FIRED GENERATION: 0.9 BILLION KILOWATTHOURS

UNION ELECTRIC COMPANY

Union Electric Company (UNEL) is a combination public utility involved in the generation, purchase and distribution of electricity, and the sale of natural gas. UNEL sells electricity to one million customers in more than 272 communities. The population is about 2.6 million. The service territory covers 24,000 square miles in portions of Missouri, Illinois and Iowa. The company also sells steam service to downtown businesses in St. Louis and state government in Jefferson City. The economic base of the service territory is primarily industrial and commercial. UNEL also owns 40 percent of Electric Energy, Incorporated in Joppa, Illinois. The company employs 7,400. UNEL is headquartered in St. Louis, Missouri.

Electric sales are approximately 28 billion kilowatthours, with a value of $1.7 billion. Total kilowatthours sold, ranks UNEL as the largest Missouri electric utility. Nationally, UNEL is ranked 23rd in sales.

UNEL has four coal-fired generating stations, located in east central Missouri near St. Louis. UNEL's total capability is 7,132 megawatts. The coal-fired capability totals 5,145 megawatts, or 72 percent of UNEL's total capability. The coal-fired capability further represents 34 percent of the state's total capability. A majority of the remaining capability consists of one nuclear station rated at 1,120 megawatts.

UNEL has 27,240 miles of above ground power lines and 8,033 miles of underground lines. The company has electrical interconnections with Central Illinois Public Service Company, Electric Energy Incorporated, Illinois Power Company, Kansas Gas and Electric Company, Public Service Company of Oklahoma, Kansas City Power and Light Company, Kentucky Utilities Company, Iowa-Illinois Gas and Electric Company, Iowa Southern Utilities Company, Missouri Public Service Company, Arkansas Power and Light Company, Associated Electric Cooperative Incorporated, St. Joseph Light and Power Company and the Tennessee Valley Authority.

Union Electric Company has electrical generation of approximately 31 billion kilowatthours. Coal accounts for 71 percent of the total. Statewide, UNEL's generation represents 57 percent of total generation.

UNEL purchased 9.7 million tons of coal in 1986. Illinois coal producers supply 9.6 million tons, or 99 percent of the total. UNEL is the largest user of Illinois coal. Of these sales, the Labadie station receives 52 percent of the total. Statewide, UNEL's Illinois coal purchases represent 46 percent of all utility coal receipts and 74 percent of Illinois coal receipts. Table 12-15 lists UNEL's Illinois coal purchases for the past four years and shows how UNEL's Illinois coal demand has stayed at about ten million tons per year. Since 1981, the delivered price has increased by 13 percent.

TABLE 12-15. UNEL'S ILLINOIS COAL PURCHASES, QUALITY OF COAL AND DELIVERED PRICES 1983-1986.

YEAR	1983	1984	1985	1986
THOUSAND TONS	10,430	11,181	10,193	9,616
PERCENT SULFUR	2.10	2.05	2.01	2.05
BTU/LB	11,187	11,254	11,193	11,206
$/TON	32.40	33.70	35.08	36.68
$/MMBTU	1.45	1.50	1.57	1.64

The next paragraphs discuss UNEL's four coal-fired stations. Table 12-16, at the end of the narrative, provides additional data on these stations and the UNEL system. Refer to Map 12-1 for the locations of these stations.

The Labadie Station is located in east central Missouri at Labadie. The station consists of four pulverized coal units with capability of 2,216 megawatts. All the units are rated at 554 megawatts. This figure represents 31 percent of the company's total capability. It is the largest coal-fired station owned by UNEL. Labadie's generation of 11.1 billion kilowatthours represents 57 percent of its capability and 36 percent of UNEL's total generation. The production expense for this station is two cents per kilowatthour, ranking second in efficiency. The fuel expense averages 1.7 cents per kilowatthour.

Labadie consumed five million tons of Illinois coal in 1986. The coal averages 11,358 BTU per pound of coal and 2.4 percent sulfur. The SO2 emission rate is 4.2 pounds per million BTU of input. Nationally, Labadie ranks sixth in total tons of SO2 emissions. Labadie is also rated difficult for FGD retrofit because of space constraints. The Illinois coal is supplied by Arch of Illinois, under contract; Consolidation Coal Company, by contract through June 1996; Freeman United Coal Mining Company, by contract through October 1992; and Kerr-McGee Coal Company, under contract through December 2004. The coal is received by rail carrier.

The Meramec Station is located in southeastern St. Louis County. It consists of four pulverized coal units with capability of 869 megawatts. Meramec is the smallest station in UNEL's system. It represents 12 percent of UNEL's total capability. The station's generation of 1.1 billion kilowatthours accounts for 14 percent of its capability and four percent of UNEL's total generation. It is the least efficient of the four coal-fired stations owned by UNEL. The average production expense per kilowatthour is 3.6 cents, with the fuel expense at two cents.

The 0.5 million tons of Illinois and Indiana coal consumed averages 11,593 BTU per pound of coal and 1.3 percent sulfur. SO2 emissions are 2.1

pounds per million BTU of input. Nationally, Meramec is ranked 164th in total tons of SO2 emissions. Units 1 and two are rated very difficult for FGD retrofit because of space constraints. Unit 3 is rated difficult because of space constraints, while Unit 3 is rated modest because of available space. Illinois coal producers supply 85 percent of the coal. The Illinois coal is supplied by Kerr-McGee Coal Company under contract through 2004 and Old Ben Coal Company by spot market. The coal is received by rail. The Indiana coal is supplied by P.V. Mining Company by spot market.

The Rush Island Station is located in east central Missouri at Crystal City. It consists of two pulverized coal units with capability of 1,160 megawatts. Both units are rated at 580 megawatts and represents 16 percent of UNEL's total capability. It is the second largest UNEL station. The station's generation of 5.7 billion kilowatthours accounts for 56 percent of its capability and 19 percent of UNEL's total generation. It is UNEL's most efficient plant. The average production expense per kilowatthour is two cents, with the fuel expense at 1.7 cents.

The 2.5 million tons of Illinois coal used averages 10,709 BTU per pound of coal and one percent sulfur. Emissions of SO2 are 1.9 pounds per million BTU of input. Nationally, the station is ranked 79th in total tons of SO2 emissions. No information is available concerning the cost of FGD retrofit. The Illinois coal is supplied by Consolidation Coal Company by contract through June 1996 and Kerr-McGee Coal Company under contract through 2004. The coal is received by railroad.

The Sioux Station is located in east central Missouri at Portage Des Sioux. It consists of two cyclone units with capability of 900 megawatts. It is the third largest UNEL station. The station represents 13 percent of UNEL's total capability. The station's generation of 3.9 billion kilowatthours accounts for 50 percent of its capability and 13 percent of UNEL's total generation. It is UNEL's third most efficient plant. The average production expense per kilowatthour is two cents, with the fuel expense at 1.7 cents.

The 1.8 million tons of Illinois and Wyoming coal averages 11,351 BTU per pound of coal and 2.7 percent sulfur. The SO2 rate is 4.7 pounds per million BTU of input. The station ranks 40th in total tons of SO2 emissions. FGD retrofit is rated modest because of age, size and availability of space. Illinois coal producers supply 85 percent of the total. Consolidation Coal Company by contract through June 1996 and Kerr-McGee Coal Company by contract through 2004 supplies the Illinois coal. The coal is received by rail. The Wyoming coal is supplied by Thunder Basin Coal Company by spot market.

TABLE 12-16
UNION ELECTRIC COMPANY
COAL-FIRED GENERATING STATIONS AND STATISTICS
1986

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA- BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
LABADIE	1	1970	554.0	PC	COAL						
	2	1971	554.0	PC	COAL						
	3	1972	554.0	PC	COAL						
	4	1973	554.0	PC	COAL						
TOTAL			2,216.0			11,103,237	57	252	1.99	10,094	4,977,000

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
ILLINOIS	4,948.0	11,358	2.43	8.69	36.61	1.612	4.172

TABLE 12-16 (CONTINUED)

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
MERAMEC	1	1953	127.0	PC	COAL						
	2	1954	127.0	PC	COAL						
	3	1958	279.0	PC	COAL						
	4	1961	336.0	PC	COAL						
TOTAL			869.0			1,056,821	14	253	3.63	12,264	543,000

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
ILLINOIS	473.0	11,656	1.28	7.30	39.26	1.684	2.141
INDIANA	61.0	11,100	1.20	10.00	28.84	1.299	2.108
TOTAL	534.0	11,593	1.27	7.61	38.07	1.642	2.136

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
RUSH	1	1976	580.0	PC	COAL						
ISLAND	2	1977	580.0	PC	COAL						
TOTAL			1,160.0			5,665,096	56	337	1.96	9,833	2,611,000

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
ILLINOIS	2,549.3	10,709	1.03	10.97	37.05	1.730	1.876

TABLE 12-16 (CONTINUED)

STATION	UNIT	ON LINE	SUMMER CAPABILIY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
SIOUX	1	1967	450.0	CY	COAL						
	2	1968	450.0	CY	COAL						
TOTAL			900.0			3,937,169	50	170	2.08	10,540	1,830,000

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
ILLINOIS	1,646.0	11,394	2.76	9.08	35.58	1.561	4.724
WYOMING	28.0	8,800	0.34	4.90	35.51	2.017	0.753
TOTAL	1,674.0	11,351	2.71	9.01	35.58	1.567	4.656

TOTAL CAPABILITY: 7,132 MEGAWATTS
COAL-FIRED CAPABILITY: 5,145 MEGAWATTS
TOTAL COAL PURCHASES: 9,705,300 TONS
ILLINOIS COAL PURCHASES: 9,616,300 TONS
TOTAL GENERATION: 30.7 BILLION KILOWATTHOURS
COAL-FIRED GENERATION: 21.8 BILLION KILOWATTHOURS

UTILICORP UNITED, INCORPORATED

Utilicorp United Incorporated (UUI) formerly Missouri Public Service Company, is a combination public utility involved in the generation, purchase and distribution of electricity, and the sale of natural gas. UUI sells electricity to about 147,000 customers in 40 communities in western Missouri. The economic base of its service territory is primarily industrial and commercial. The company employs approximately 900. UUI is headquartered in Kansas City, Missouri.

Electric sales are nearly three billion kilowatthours, valued at $193 million. Total kilowatthours sold ranks UUI as the fifth largest Missouri electric utility. Nationally, UUI is ranked 94th in sales.

UUI owns one coal-fired generating station, located in west central Missouri at Sibley. UUI also owns eight percent (161 megawatts) of Kansas Power and Light Company's Jeffrey Energy Center, which consists of three coal-fired units (2,013 megawatts). UUI's total capability is 917 megawatts. The coal-fired capability totals 622 megawatts, representing 68 percent of UUI's total capability. The coal-fired capability located in Missouri represents three percent of the state's total capability.

UUI has 6,003 miles of above ground power lines and 526 miles of underground lines. The company has electrical interconnections with Kansas Gas and Electric Company, Kansas City Power and Light Company, Associated Electric Cooperative Incorporated, Empire District Electric Company, Union Electric Company, KAMO Electric Cooperative, Kansas Power and Light Company and the City of Independence.

UUI has generation of approximately 2.4 billion kilowatthours. Of this generation, coal accounts for most of the total. Statewide, UUI's generation in Missouri represents three percent of total generation.

UUI purchased 0.8 million tons of coal from two Illiniois coal producers in 1986. For Missouri, UUI's Illinois coal receipts account for four percent of total utility coal demand and six percent of Illinois coal demand. Table 12-17 lists the Illinois coal purchases, quality of coal and delivered prices for the past four years. Since 1983, the quantity and delivered price of Illinois coal have stayed relatively the same.

TABLE 12-17. UUI'S ILLINOIS COAL PURCHASES, QUALITY OF COAL AND DELIVERED PRICES 1983-1986.

YEAR	1983	1984	1985	1986
THOUSAND TONS	755	617	538	790
PERCENT SULFUR	3.24	3.25	3.19	3.22
BTU/LB	10,886	10,768	10,850	10,952
$/TON	39.18	39.01	39.10	39.21
$/MMBTU	1.80	1.81	1.80	1.79

The following paragraphs discuss UUI's one coal-fired station. Table 12-18 provides additional data on the station. Map 12-1 at the end of the Missouri section, shows the location of the facility.

The Sibley Station is located in west central Missouri at Sibley. The station consists of three cyclone units with capability of 461 megawatts. Unit 3 is the largest with 364 megawatts. The station represents 50 percent of the company's total capability. Sibley's generation of 1.5 billion kilowatthours accounts for 37 percent of its capability and 63 percent of UUI's total generation. The production expense for the station is 2.5 cents per kilowatthour, with the fuel expense at 1.9 cents.

Sibley consumed 0.7 million tons of Illinois coal in 1986. The coal averages 10,952 BTU per pound of coal and 3.2 percent sulfur. SO2 emissions are 5.7 pounds per million BTU of input. Nationally, Sibley is ranked 118th in total tons of SO2 emissions. The station is rated modest for FGD retrofit because of age, size and availability of space. The Illinois coal is supplied by Arch of Illinois by contract (June 1989) and Zeigler Coal Company, by contract. The coal is received by rail and barge.

TABLE 12-18
UTILICORP UNITED, INCORPORATED
(MISSOURI PUBLIC SERVICE COMPANY)
COAL-FIRED GENERATING STATION AND STATISTICS
1986

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
SIBLEY	1	1960	49.6	CY	COAL						
	2	1962	47.3	CY	COAL						
	3	1969	364.2	CY	COAL						
TOTAL			461.1			1,504,582	37	175	2.45	10,253	705,000

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
ILLINOIS	790.0	10,952	3.22	10.63	39.21	1.790	5.733

TOTAL CAPABILITY:	917 MEGAWATTS
COAL-FIRED CAPABILITY:	622 MEGAWATTS
TOTAL COAL PURCHASES:	790,000 TONS
ILLINOIS COAL PURCHASES:	790,000 TONS
TOTAL GENERATION:	2.4 BILLION KILOWATTHOURS
COAL-FIRED GENERATION:	2.4 BILLION KILOWATTHOURS

CHAPTER THIRTEEN

TENNESSEE

Tennessee electric utilities purchased approximately 23 million tons of coal and 0.1 million barrels of petroleum in 1986. For these categories, coal represented three percent of U.S. utility coal purchases while petroleum was only negligible. On a BTU basis, Tennessee utilities purchased three percent of the nation's fuel for electric generation. Table 13-1 lists the primary fuel sources used by Tennessee electric utilities. As seen in the table, almost all of the fossil-fuel receipts is coal.

TABLE 13-1. TENNESSEE FOSSIL-FUEL SOURCES FOR ELECTRIC GENERATION.

FUEL	QUANTITY (000)	BTU (BILLION)	% OF TOTAL	$/UNIT	$/MMBTU
COAL	22,535 tons	536,687	99.9	33.79	1.42
PETROLEUM	137 bls.	795	.1	19.57	3.37
TOTAL		537,482	100.0		

Tennessee has one investor-owned utility, 63 municipal systems, 20 rural electric cooperatives and two U.S. Government systems. The major suppliers of electricity are the Tennessee Valley Authority and the U.S Army Corps of Engineers. These two federal systems account for most of Tennessee's utility generation, with over 90 percent of the total from the Tennessee Valley Authority.

Tennessee's electric utilities have 17,003 megawatts of capability, accounting for three percent of the U.S. total. This capability consists of 9,289 megawatts of coal-fired; 3,750 megawatts of hydro; 2,296 megawatts of nuclear-fired; 1,152 megawatts of petroleum-fired; and 516 megawatts of natural gas-fired. Coal-fired capability accounts for 55 percent of the total. Of the 44 states that have coal-fired generation, Tennessee ranks 13th. Table 13-2 shows the breakdown of Tennessee's total capability.

TABLE 13-2. TENNESSEE SUMMER CAPABILITY.

TYPE OF CAPABILITY	TOTAL	COAL	NUCLEAR	PETROLEUM	NATURAL GAS	WATER
MEGAWATTS	17,003	9,289	2,296	1,152	516	3,750
NO. OF UNITS	164	37	2	20	20	85
% OF TN TOTAL	100	55	14	7	3	21
% OF U.S. TOTAL	3	3	3	1	--	4

The Tennessee Valley Authority has plans of adding two nuclear units in the future. Table 13-3 details these generating station.

TABLE 13-3. FUTURE BASELOAD CAPABILITY IN TENNESSEE.

UTILITY	STATION AND UNIT	CAPABILITY (MW)	FUEL	ON LINE
TENNESSEE VALLEY AUTHORITY	Watts Bar 1	1,152	Uranium	1990
	Watts Bar 2	1,152	Uranium	1991
TOTAL		2,304		

Net generation by Tennessee electric utilities totals 56 thousand gigawatthours, a reduction of 15 percent from 1985. Broken down by energy source, coal supplies 91 percent of the total, with the remainder from hydro. The Tennessee Valley Authority's two nuclear units are still out of service. On a national basis, Tennessee ranks 17th in electrical generation and accounts for two percent of total generation. Table 13-4 details each category.

TABLE 13-4. TENNESSEE NET GENERATION.

TYPE OF CAPABILITY	TOTAL	COAL	NUCLEAR	PETROLEUM	WATER
GIGAWATTHOURS	56,455	51,108	--	126	5,326
% OF TN TOTAL	100	91	--	--	9
% OF U.S. TOTAL	2	4	--	--	2

In 1986, Tennessee utilities purchased approximately 23 million tons of coal. This coal is supplied by six coal producing states. The sulfur content varies from 1.1 percent to 2.7 percent, with a weighted average of two percent. The BTU content varies from 11,706 to 12,855 per pound of coal, with an average of 11,908. On a BTU cost basis, Illinois coal has the lowest delivered price at $1.23 per million BTU, while eastern Kentucky coal is the most expensive at $1.61 per million BTU. Table 13-5 lists the various coal supplying states and their respective quantities and qualities of coal sold in Tennessee. Kentucky coal producers supply 72 percent of Tennessee's total coal receipts.

TABLE 13-5. TENNESSEE COAL SUPPLIERS.

STATE/REGION	TONS (000)	% OF TOTAL	BTU/LB	% SULFUR	$/TON	$/MMBTU
W. KENTUCKY	10,463	46	11,864	2.72	33.25	1.40
E. KENTUCKY	5,941	26	11,706	1.11	37.78	1.61
ILLINOIS	2,915	13	11,749	1.89	28.77	1.23
TENNESSEE	1,811	8	12,453	1.41	31.23	1.25
VIRGINIA	1,004	5	12,855	1.19	34.83	1.36
W. VIRGINIA	330	1	12,490	2.47	34.10	1.39
INDIANA	71	--	11,758	1.38	35.20	1.50
TOTAL/AVERAGE	22,535	100	11,908	2.01	33.79	1.42

Illinois coal suppliers sold about three million tons of coal to the Tennessee Valley Authority in 1986, representing 13 percent of Tennessee's total utility coal receipts. Illinois coal sales are to three of TVA's generating stations located in Tennessee. Illinois coal sales for the period 1981 through 1986 are shown in Table 13-6. As seen in the table, the TVA has increased its demand for Illinois coal dramatically since 1981, while the delivered price has fallen by 25 percent.

TABLE 13-6. TENNESSEE'S ILLINOIS COAL PURCHASES,QUALITY OF COAL AND DELIVERED PRICES 1981-1986.

YEAR	1981	1982	1983	1984	1985	1986
THOUSAND TONS	247	12	36	947	1,425	2,915
PERCENT SULFUR	2.20	2.00	2.00	2.00	1.90	1.89
BTU/LB	11,720	11,600	11,430	11,733	11,557	11,749
$/TON	38.58	34.43	29.76	34.22	29.48	28.77
$/MMBTU	1.65	1.48	1.31	1.46	1.28	1.23

A discussion of the TVA generating stations follows. See the Alabama section, Chapter 2, for a discussion of the Tennessee Valley Authority and Map 2-1 for the locations of these coal-fired generating stations.

TENNESSEE VALLEY AUTHORITY - TENNESSEE

The TVA has 16,313 megawatts of capability located in Tennessee. This capability consists of seven coal-fired stations with capability of 9,289 megawatts; 17 hydro stations rated at 3,060 megawatts; one nuclear station with 2,296 megawatts; and three natural gas/petroleum-fired stations with 1,668 megawatts. Overall, this capability represents 96 percent of Tennessee's total capability. TVA's Tennessee capability accounts for 58 percent of TVA's entire system.

TVA's Tennessee production is approximately 51 billion kilowatthours, representing 90 percent of Tennessee's total generation. Of TVA's total generation, the Tennessee production accounts for 56 percent of the total. TVA has no nuclear generation because the station is out of service for the near term.

The TVA purchased approximately 22.5 million tons of coal for its Tennessee facilities. Of this total, 2.9 million tons are from Illinois, representing 13 percent. Most of the Illinois coal is used at the Johnsonville Station. The Illinois coal averages 11,749 BTU per pound of coal and 1.9 percent sulfur. A majority of the Illinois coal is purchased on the spot market, primarily because of no nuclear generation at the present time. Table 13-7 shows the TVA's Illinois coal purchases for its stations located in Tennessee. As seen in the table, the TVA has increased its demand for Illinois coal by about 2.9 million tons since 1983. For this same period, the delivered price has decreased by three percent.

TABLE 13-7. TVA'S ILLINOIS COAL PURCHASES, QUALITY OF COAL AND DELIVERED PRICES 1983-1986.

YEAR	1983	1984	1985	1986
THOUSAND TONS	36	947	1,350	2,915
PERCENT SULFUR	2.01	2.03	1.82	1.89
BTU/LB	11,430	11,733	11,536	11,749
$/TON	29.77	34.22	29.60	28.77
$/MMBTU	1.30	1.46	1.28	1.23

Following is a description of TVA's seven coal-fired stations located in Tennessee. Table 13-8, at the end of the narrative, provides additional data on these stations. Refer to Map 2-1, Alabama, for the locations of these stations.

The Allen Station is located in southwestern Tennessee at Memphis. The plant has three cyclone units with capability of 873 megawatts. The capability accounts for five percent of TVA's Tennessee capability. The station's 3.6 billion kilowatthours of generation represents 47 percent of its capability and seven percent of TVA's Tennessee generation. The average cost of generation is 1.8 cents per kilowatthour, with the fuel expense at 1.4 cents. Of the TVA's 11 coal-fired stations, Allen ranks sixth in economic efficiency.

The 1.4 million tons of Illinois and Kentucky coal purchased and consumed in 1986 averages 2.3 percent sulfur and 12,048 BTU per pound of coal. Allen's SO2 emission rate is 3.7 pounds per million BTU of input. Nationally, Allen ranks 68th in total tons of SO2 emissions. The station is rated difficult for FGD retrofit because of space constraints. The Illinois coal is supplied by Old Ben Coal Company, by spot market and Tek-Bar Industries Inc., under contract. The coal is received by rail and barge. The Kentucky coal is supplied by Brown Badgett Incorporated by contract, Hago Corporation by contract, Middle Kentucky Construction by contract and Pyro Mining Company through contract.

The Bull Run Station is located in east central Tennessee at Clinton. The station consists of one pulverized coal unit rated at 900 megawatts of capability. The station represents six percent of TVA's Tennessee capability. The station's generation of 5.3 billion kilowatthours represents 67 percent of its capability. This figure also represents ten percent of TVA's Tennessee generation. The average cost per kilowatthour was two cents. Of this total, the fuel expense averages 1.8 cents. Bull Run ranks seventh in economic efficiency.

The 2.1 million tons of Kentucky coal consumed averages 11,410 BTU per pound of coal and 0.9 percent sulfur. SO2 emissions are 1.5 pounds per million BTU of input. The station is ranked 116th in total tons of SO2 emissions, nationally. No information is available concerning the cost consideration for FGD retrofit. The coal is supplied by Falcon Coal Company by contract.

The Cumberland Station is located in north central Tennessee at Cumberland City. The station consists of two pulverized coal units with capability of 2,538 megawatts. It is the largest TVA plant in Tennessee. The capability accounts for 16 percent of TVA's Tennessee capability. The station's 15.2 billion kilowatthours of generation represents 69 percent of its capability and 30 percent of TVA's Tennessee generation. The average cost of generation is 1.6 cents per kilowatthour, with the fuel expense at 1.4 cents. Cumberland is the TVA's second most efficient coal-fired station.

The 6.5 million tons of coal consumed averages 2.8 percent sulfur and 11,656 BTU per pound of coal. The station has an SO2 emission rate of 4.7 pounds per million BTU of input. Nationally, Cumberland is third in total tons of SO2 emissions. The station is rated easy for FGD retrofit because of age, size and availability of space. A small percentage of Illinois coal is used at the station, with a majority of the coal from Kentucky. The Illinois coal is supplied by Old Ben Coal Company, by spot market and Tek-Bar Industries, Inc., under contract. The coal is received by rail and barge. The major Kentucky coal suppliers are Peabody Coal Company and Island Creek Coal Company, both by contract.

The Gallatin Station is located in north central Tennessee at Gallatin. The station has four older pulverized coal units with capability of 1,080 megawatts. The capability accounts for seven percent of TVA's Tennessee capability. The station's 6.1 billion kilowatthours of generation represents 64 percent of its capability and 12 percent of TVA's Tennessee generation. The average cost of generation is 1.7 cents per kilowatthour, with the fuel expense at 1.4 cents. Gallatin ranks fourth in economic efficiency.

The 2.3 million tons of coal consumed in 1986 averages 2.7 percent sulfur and 12,397 BTU per pound of coal. SO2 emissions are 4.3 pounds per million BTU of input. Nationally, it is ranked 28th in total tons of SO2 emissions. Gallatin is rated difficult for FGD retrofit because of age and limited space. Most of the coal is supplied by Kentucky coal producers with a small amount from Tennessee. The major Kentucky coal suppliers are Island Creek Coal Company and Pyro Mining Company, both through contract.

The Johnsonville Station is located in northwestern Tennessee at Johnsonville. The plant has ten older pulverized coal units with a capability of 1,294 megawatts. The capability accounts for eight percent of TVA's Tennessee capability. The station's 6.2 billion kilowatthours of generation represents 55 percent of its capability and 12 percent of TVA's Tennessee generation. The average cost of generation is 1.7 cents per kilowatthour. The fuel expense averages 1.4 cents per kilowatthour. The station ranks fifth in economic efficiency.

The 2.9 million tons of coal consumed averages 1.8 percent sulfur and 11,696 BTU per pound of coal. SO2 emissions are three pounds per million BTU of input. Nationally, the station is ranked 31st in total tons of SO2 emissions. It is rated very difficult for FGD retrofit because of age and limited space. Illinois supplies 77 percent of its coal needs, with the balance from Indiana and Kentucky. The Illinois coal is supplied by Old Ben Coal Company and Consolidation Coal Company, by spot market. The coal is received by railroad. The major Kentucky coal supplier is Addington Brothers Mining Company by contract, while the major Indiana supplier is Yancy Minerals Incorporated by contract.

The Kingston Station is located in east central Tennessee at Gallatin. The plant consists of nine older pulverized coal units with capability of 1,580 megawatts. It is the second largest TVA station in Tennessee. The capability accounts for ten percent of TVA's Tennessee capability. The station's 9.7 billion kilowatthours of generation represents 70 percent of its capability and 19 percent of TVA's Tennessee generation. The average cost of generation is 1.7 cents per kilowatthour. The fuel expense averages 1.5 cents per kilowatthour. Kingston is TVA's third most efficient station.

The four million tons of coal burned averages 1.2 percent sulfur and 11,097 BTU per pound of coal. Kingston's SO2 emission rate is 1.9 pounds per million BTU of input. The station is ranked 55th in tons of SO2 emissions, nationally. No information is available concerning the cost of FGD retrofit. Kentucky supplies 63 percent of the coal, with the remainder from Tennessee. The major Kentucky coal suppliers are Diversified Energy Incorporated and Falcon Coal Company, both by contract. The major Tennessee coal supplier is B&W Coal Company by contract.

The Sevier Station is located in northeastern Tennessee at Rogerville. The plant has four older pulverized coal units with capability of 800 megawatts. Each unit is rated at 200 megawatts. The capability accounts for five percent of TVA's Tennessee capability. The station's five billion kilowatthours of generation represents 71 percent of its capability and ten percent of TVA's Tennessee generation. The average cost of generation is 1.6 cents per kilowatthour, with the fuel expense at 1.3 cents. Sevier is the TVA's most efficient plant.

The 1.9 million tons of coal used averages 1.4 percent sulfur and 12,542 BTU per pound of coal. SO2 emissions are 2.2 pounds per million BTU of input. Nationally, Sevier is ranked 59th in total tons of SO2 emissions. The station is rated very difficult for FGD retrofit because of age and limited space. Virginia coal operators supply 50 percent of the coal. The remainder is from Kentucky, Tennessee and West Virginia. The station has a large number of coal suppliers.

TABLE 13-8
TENNESSEE VALLEY AUTHORITY-TENNESSEE
COAL-FIRED GENERATING STATIONS AND STATISTICS
1986

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
ALLEN	1	1964	291.0	CY	COAL						
	2	1964	291.0	CY	COAL						
	3	1964	291.0	CY	COAL						
TOTAL			873.0			3,564,518	47	53	1.78	9,700	1,443,000

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
ILLINOIS	433.7	11,906	2.16	8.06	28.13	1.181	3.538
KENTUCKY	1,083.1	12,105	2.31	8.54	34.35	1.419	3.721
TOTAL	1,516.8	12,048	2.27	8.40	32.57	1.352	3.674

TABLE 13-8 (CONTINUED)

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
BULL RUN	1	1967	900.0	PC	COAL	5,266,586	67	232	1.98	8,870	2,055,000

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
KENTUCKY	2,214.2	11,410	0.[illegible]	14.30	43.19	1.892	1.453

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
CUMBER- LAND	1	1972	1,269.0	PC	COAL						
	2	1973	1,269.0	PC	COAL						
TOTAL			2,538.0			15,244,067	69	254	1.59	9,920	6,472,000

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
ILLINOIS	98.1	11,610	2.50	8.69	26.46	1.139	4.199
KENTUCKY	6,672.5	11,618	2.80	8.58	31.55	1.358	4.700
W. VIRGINIA	306.6	12,508	2.51	11.52	34.39	1.375	3.913
TOTAL	7,077.2	11,656	2.78	8.71	31.61	1.356	4.651

TABLE 13-8 (CONTINUED)

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
GALLATIN	1	1956	256.0	PC	COAL						
	2	1957	256.0	PC	COAL						
	3	1959	284.0	PC	COAL						
	4	1959	284.0	PC	COAL						
TOTAL			1,080.0			6,098,512	64	187	1.67	9,340	2,307,000

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
KENTUCKY	2,663.1	12,398	2.71	8.23	37.17	1.499	4.262
TENNESSEE	4.8	11,825	2.60	13.20	27.20	1.150	4.288
TOTAL	2,667.9	12,397	2.71	8.24	37.15	1.498	4.263

TABLE 13-8 (CONTINUED)

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
JOHNSON-VILLE	1	1951	119.0	PC	COAL						
	2	1951	119.0	PC	COAL						
	3	1952	119.0	PC	COAL						
	4	1952	119.0	PC	COAL						
	5	1952	119.0	PC	COAL						
	6	1953	119.0	PC	COAL						
	7	1958	145.0	PC	COAL						
	8	1958	145.0	PC	COAL						
	9	1959	145.0	PC	COAL						
	10	1959	145.0	PC	COAL						
TOTAL			1,294.0			6,192,664	55	216	1.69	10,990	2,914,000

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
ILLINOIS	2,382.6	11,725	1.81	7.94	28.98	1.236	3.010
INDIANA	71.0	11,758	1.38	9.37	35.20	1.497	2.289
KENTUCKY	659.9	11,583	1.81	10.68	28.23	1.219	3.047
TOTAL	3,113.5	11,696	1.80	8.55	28.97	1.238	3.001

TABLE 13-8 (CONTINUED)

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
KINGSTON	1	1954	145.0	PC	COAL						
	2	1954	145.0	PC	COAL						
	3	1954	145.0	PC	COAL						
	4	1954	145.0	PC	COAL						
	5	1954	200.0	PC	COAL						
	6	1955	200.0	PC	COAL						
	7	1955	200.0	PC	COAL						
	8	1955	200.0	PC	COAL						
	9	1955	200.0	PC	COAL						
TOTAL			1,580.0			9,732,517	70	180	1.66	9,760	3,936,000

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
KENTUCKY	2,457.5	11,853	1.04	12.63	37.06	1.563	1.711
TENNESSEE	1,466.4	12,507	1.32	10.76	31.97	1.278	2.058
TOTAL	3,923.9	12,097	1.15	11.93	35.16	1.453	1.854

TABLE 13-8 (CONTINUED)

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
SEVIER	1	1955	200.0	PC	COAL						
	2	1955	200.0	PC	COAL						
	3	1956	200.0	PC	COAL						
	4	1957	200.0	PC	COAL						
TOTAL			800.0			5,010,372	71	166	1.57	9,570	1,925,000

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
KENTUCKY	654.1	12,229	1.59	31.14	1.27	1.563	2.535
TENNESSEE	339.8	12,232	1.79	12.46	28.06	1.147	2.854
VIRGINIA	1,004.2	12,855	1.19	9.63	34.83	1.355	1.805
W. VIRGINIA	23.2	12,371	2.35	13.46	28.37	1.147	3.704
TOTAL	2,021.3	12,542	1.43	10.89	32.42	1.293	2.223

TOTAL CAPABILITY: 28,863 MEGAWATTS
COAL-FIRED CAPABILITY: 16,303 MEGAWATTS
TOTAL COAL PURCHASES: 36,600,000 TONS
ILLINOIS COAL PURCHASES: 149,000 TONS
TOTAL GENERATION: 91 BILLION KILOWATTHOURS
COAL-FIRED GENERATION: 83 BILLION KILOWATTHOURS

CHAPTER FOURTEEN

WISCONSIN

Wisconsin electric utilities purchased approximately 17 million tons of coal; 0.2 million barrels of petroleum; and one billion cubic feet of natural gas in 1986. Coal represented two percent of U.S. utility coal purchases, while petroleum and natural gas were only negligible. On a BTU basis, Wisconsin utilities purchased two percent of the nation's fuel for electrical generation. Table 14-1 lists the fossil-fuel sources for Wisconsin electric utilities. Over 99 percent of the fossil-fuel demand is from coal.

TABLE 14-1. WISCONSIN FOSSIL-FUEL SOURCES FOR ELECTRIC GENERATION.

FUEL	QUANTITY (000)	BTU (BILLION)	% OF TOTAL	$/UNIT	$/MMBTU
COAL	16,815 tons	324,921	99.3	31.37	1.62
PETROLEUM	163 bls.	944	.3	20.86	3.60
NATURAL GAS	1,203 mmcf.	1,207	.4	3.76	3.75
TOTAL		327,072	100.0		

Wisconsin has 13 investor-owned utilities, 83 municipal systems, 30 rural electric cooperatives and three state systems. The major suppliers of electricity are Wisconsin Electric Power Company, Wisconsin Power and Light Company, Wisconsin Public Service Company, Dairyland Power Cooperative and Madison Gas and Electric Company. These utilities account for over 95 percent of Wisconsin's electrical generation.

Wisconsin electric utilities have 10,939 megawatts of capability, representing two percent of the nation's total. This capability consists of 7,450 megawatts of coal-fired; 1,547 megawatts of nuclear-fired; 1,143 megawatts of petroleum-fired; 299 megawatts of natural gas-fired; 415 megawatts of water; and 86 megawatts of other. Coal capability accounts for 68 percent of the total. Of the 44 states that have coal-fired generation, Wisconsin ranks 15th. Wisconsin utilities have no plans of adding coal-fired capability in the near term. Table 14-2 breaks down Wisconsin's summer capability by fuel type.

TABLE 14-2. WISCONSIN SUMMER CAPABILITY.

TYPE OF CAPABILITY	TOTAL	COAL	NUCLEAR	PETROLEUM	NATURAL GAS	WATER	OTHER
MEGAWATTS	10,939	7,450	1,547	1,143	299	415	86
NO. OF UNITS	411	61	4	110	21	208	7
% OF WI TOTAL	100	68	14	10	3	4	1
% OF U.S. TOTAL	2	3	2	1	--	--	2

Net generation by Wisconsin electric utilities totals 43 thousand gigawatthours, an increase of four percent from 1985. Broken down by energy source, coal supplies 68 percent of the total and nuclear 26 percent. On a national basis, Wisconsin ranks 22nd in electrical generation and accounts for two percent of the total generation. For the U.S. total, Wisconsin coal generation accounts for two percent, while nuclear was three percent. Table 14-3 details each category of generation.

TABLE 14-3. WISCONSIN NET GENERATION.

TYPE OF CAPABILITY	TOTAL	COAL	NUCLEAR	PETROLEUM	NATURAL GAS	WATER	OTHER
GIGAWATTHOURS	42,785	29,100	11,199	109	105	2,161	112
% OF WI TOTAL	100	68	26	--	--	5	--
% OF U.S. TOTAL	2	2	3	--	--	1	1

Wisconsin electric utilities purchased approximately 17 million tons of coal in 1986. This coal is supplied by ten coal producing states. The sulfur content varies from 0.3 percent to 2.7 percent, with a weighted average of 0.9 percent. The BTU content varies from 8,489 to 13,144 per pound of coal, with an average of 9,662. On a BTU cost basis, western Kentucky and Virginia coals have the lowest delivered price at $1.49 per million BTU, while Ohio coal is the most expensive at $2.09 per million BTU. Table 14-4 lists the various coal supplying states and their respective quantities and qualities of coal sold to Wisconsin utilities.

TABLE 14-4. WISCONSIN COAL SUPPLIERS.

STATE/REGION	TONS (000)	% OF TOTAL	BTU/LB	% SULFUR	$/TON	$/MMBTU
WYOMING	9,167	55	8,489	.32	26.35	1.55
MONTANA	2,073	12	8,669	.77	28.83	1.66
INDIANA	1,763	10	11,270	1.94	38.75	1.72
ILLINOIS	1,491	9	11,587	1.82	40.68	1.76
PENNSYLVANIA	1,377	8	12,990	1.57	44.20	1.71
W. KENTUCKY	699	4	12,179	2.69	36.33	1.49
WEST VIRGINIA	96	1	12,587	1.06	42.27	1.70
E. KENTUCKY	92	1	13,144	.92	48.82	1.86
VIRGINIA	37	--	12,856	1.63	38.17	1.49
NEW MEXICO	20	--	12,734	.42	50.10	1.97
OHIO	1	--	12,800	2.60	53.48	2.09
TOTAL/AVERAGE	16,816	100	9,662	.90	31.37	1.62

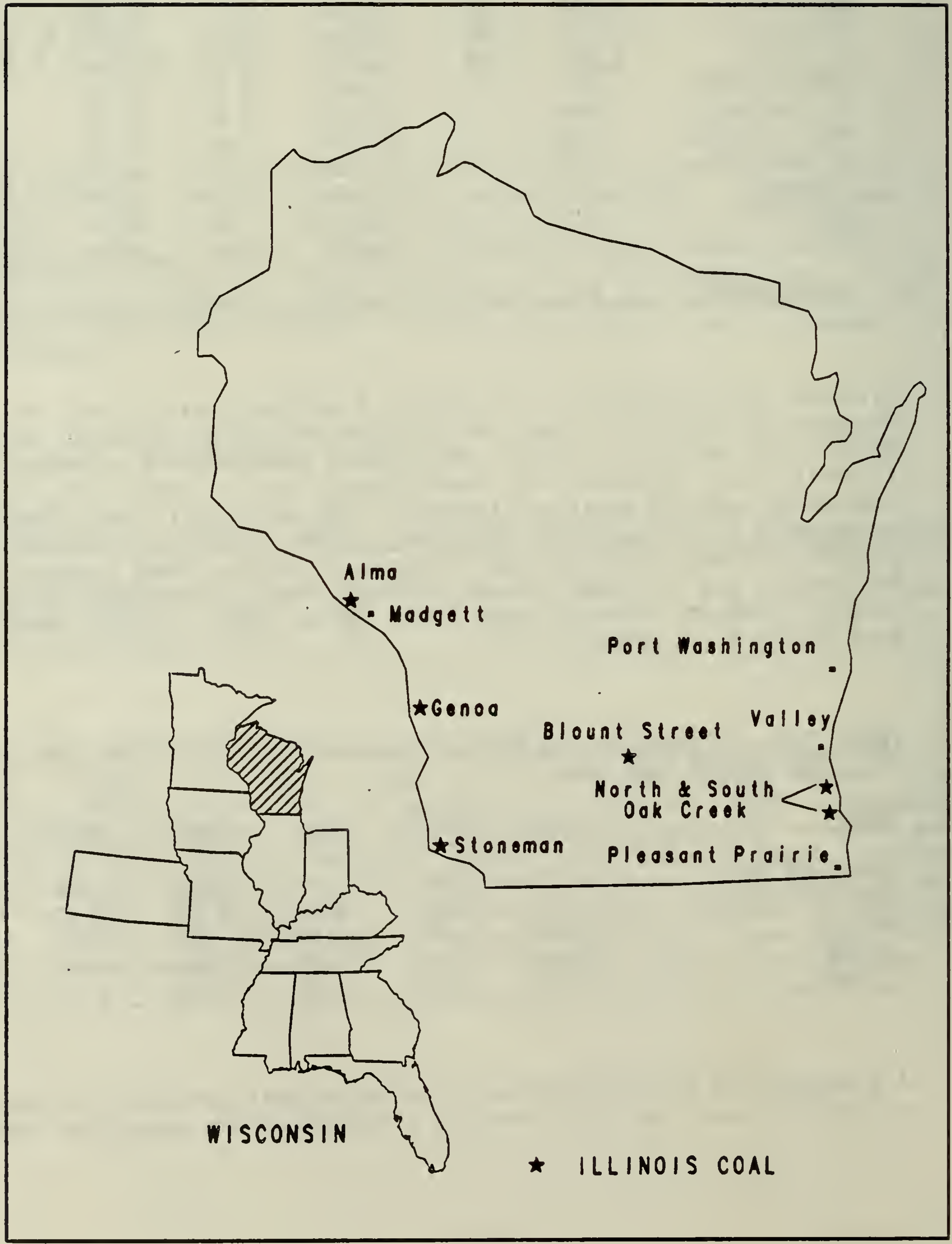
Illinois coal suppliers sold about 1.5 million tons of coal to three Wisconsin utilities in 1986. The Illinois coal sales represent about nine percent of Wisconsin's total utility coal receipts. The reduction in Illinois coal receipts, in recent years, is a result of Wisconsin tightening its SO2 emission standard. The major coal supplying states are Wyoming and Montana with 67 percent of the total. Illinois coal sales include Wisconsin Electric Power Company, Dairyland Power Cooperative and Madison Gas and Electric Company. Illinois coal sales for the period 1981 through 1986 are shown in Table 14-5. Since 1981, Illinois coal sales have fallen by 45 percent.

TABLE 14-5. WISCONSIN'S ILLINOIS COAL PURCHASES, QUALITY OF COAL AND DELIVERED PRICES 1981-1986.

YEAR	1981	1982	1983	1984	1985	1986
THOUSAND TONS	2,717	3,295	3,409	2,994	1,478	1,491
PERCENT SULFUR	2.80	2.60	2.80	2.80	2.40	1.82
BTU/LB	11,046	11,137	11,193	11,063	11,513	11,587
$/TON	33.99	36.78	36.55	37.64	40.84	40.68
$/MMBTU	1.54	1.65	1.63	1.70	1.77	1.76

A discussion of the three Wisconsin utilities that purchased Illinois coal in 1986 follows. Map 14-1 shows the locations of the generating stations.

MAP 14-1
COAL FIRED GENERATING STATIONS



Dairyland Power Cooperative Incorporated (DPC) headquartered in LaCrosse, Wisconsin, is an electric cooperative involved in the generation and wholesale of electricity to 29 rural electric distribution cooperatives, with more than 174,000 customers. Electric sales are approximately four billion kilowatthours, with a value of $159 million. The service territory includes 62 counties and covers 45,000 square miles in five states. The five states are Wisconsin, Minnesota, Iowa, Illinois and Michigan. DPC employs about 700.

DPC has four coal-fired generating stations, located in central and southern Wisconsin. These stations have capability of 785 megawatts, representing 91 percent of DPC's total capability. The coal-fired capability represents seven percent of Wisconsin's total capability. DPC has one nuclear unit rated at 51 megawatts.

DPC has electrical generation of nearly three billion kilowatthours. Coal generates about 90 percent of the total. The three billion kilowatthours reprsent seven percent of Wisconsin's total generation.

The co-op has 3,267 miles of transmission lines. DPC has electrical interconnections with Northern States Power Company, Interstate Power Company, Wisconsin Power and Light Company and Northwestern Wisconsin Electric Company.

DPC purchased 2.2 million tons of coal in 1986. The coal is supplied by Illinois, Montana and Wyoming coal producers, with Illinois supplying 14 percent of the total. DPC's Illinois coal demand represents two percent of Wisconsin's utility coal receipts and accounts for 21 percent of Illinois coal purchases in Wisconsin. Table 14-6 lists DPC's Illinois coal purchases, quality of coal and delivered prices since 1983. DPC has decreased its Illinois coal receipts by 55 percent, while the delivered price has fallen by four percent.

TABLE 14-6. DPC'S ILLINOIS COAL PURCHASES, QUALITY OF COAL AND DELIVERED PRICES 1983-1986.

YEAR	1983	1984	1985	1986
THOUSAND TONS	713	757	360	320
PERCENT SULFUR	3.22	3.06	2.99	2.82
BTU/LB	10,792	10,740	10,835	10,890
$/TON	34.40	34.77	35.15	33.35
$/MMBTU	1.59	1.62	1.62	1.53

The following paragraphs discuss the four coal-fired generating stations. Table 14-7, at the end of this narrative, supplies additional information on these stations and systemwide data. Map 14-1 shows the locations of these stations.

The Alma Station is located in Buffalo County at Alma. It consists of five older pulverized coal units with capability of 186 megawatts. The station represents 21 percent of DPC's total capability. Alma's generation of 0.5 billion kilowatthours represents 30 percent of its capability and accounts for 17 percent of DPC's total generation. The average cost per kilowatthour of generation is 2.4 cents. Of this total, the fuel expense averages two cents. Alma is DPC's second most efficient station.

The station burned 0.2 million tons of Illinois, Pennsylvania, West Virginia and Montana coal in 1986. The coal averages 10,989 BTU per pound of coal and 1.4 percent sulfur. SO2 emissions are 2.4 pounds per million BTU of input. Nationally, Alma is ranked 160th in total tons of SO2 emissions. No information is available concerning the cost of FGD retrofit. The Illinois coal is supplied by Consolidation Coal Company and Peabody Coal Company, both by contract. The coal is received by barge and rail. The Wyoming coal is supplied by Amax Coal Company by contract through 1997. Westmoreland Resources Company supplies the Montana coal by contract through 1993. The Pennsylvania coal is supplied by U.S. Steel Mining Company by contract.

The Genoa Station is located in southern Wisconsin at New Genoa. It consists of one pulverized coal unit with capability of 353 megawatts, representing 20 percent of DPC's total capability. DPC owns 50 percent of the station. The 1.5 billion kilowatthours of generation represents 50 percent of its capability and 25 percent of DPC's total generation. The cost per kilowatthour of generation is 1.9 cents, with the fuel expense at 1.6 cents. Genoa is DPC's most efficient station.

The station burned 0.7 million tons of coal in 1986. The coal averages 10,889 BTU per pound of coal and 1.7 percent sulfur. The SO2 emission rate is 3.1 pounds per million BTU of input. Genoa ranks 105th nationally in total tons of SO2 emissions. The station is rated very difficult for FGD retrofit because of limited space. Illinois coal producers supply about 30 percent of the coal. The Illinois coal is supplied by Peabody Coal Company under contract and Consolidation Coal Company by contract through 1989. The coal is received by rail and barge. The Pennsylvania coal is supplied by U.S. Steel Mining Company by contract, while the Montana coal is supplied by Westmoreland Resources Company by contract through 1993.

The Madgett Station is located in central Wisconsin at Alma. The station is adjacent to the Alma station. It consists of one relatively new pulverized coal unit with capability of 371 megawatts. The station represents 43 percent of DPC's total capability. Madgett's generation of 1.4 billion kilowatthours represents 43 percent of its capability and 47 percent of DPC's total generation. The cost per kilowatthour of generation is 2.6 cents, with the fuel expense at 2.3 cents. The station ranks third in economic efficiency.

Madgett uses a compliance coal to meet the U.S. Environmental Protection Agency's New Source Performance Standard. The station burned one million tons of Wyoming coal in 1986. The coal averages 8,377 BTU per pound of coal and 0.3 percent sulfur. SO2 emissions are 0.8 pound per million BTU of input.

The Stoneman Station is located at the southern edge of Wisconsin at Cassville. It consists of two older pulverized coal units with capability of 53 megawatts. Stoneman is DPC's smallest coal-fired station and represents six percent of DPC's total capability. Stoneman's generation of 51 million kilowatthours represents 11 percent of its capability and a small amount of DPC's total generation. The cost per kilowatthour of generation is 2.9 cents, while the fuel expense averages 2.4 cents. It is the least efficient of the four coal-fired stations.

The station burned 30,000 tons of Illinois and Pennsylvania coal in 1986. The coal averages 12,369 BTU per pound of coal and two percent sulfur. The SO2 emission rate is 3.2 pounds per million BTU of input. No information is available concerning the cost consideration for FGD retrofit. Peabody Coal Company supplies the Illinois coal under contract. The coal is received by rail. The Pennsylvania coal is supplied by Consolidation Coal Company and U.S. Steel Mining Company, both by contract.

TABLE 14-7
DAIRYLAND POWER COOPERATIVE
COAL-FIRED GENERATING STATIONS AND STATISTICS
1986

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
ALMA	1	1947	20.2	PC	COAL						
	2	1947	19.7	PC	COAL						
	3	1951	20.1	PC	COAL						
	4	1957	48.9	PC	COAL						
	5	1959	76.6	PC	COAL						
TOTAL			185.5			495,540	30	N.A.	2.40	12,462	281,000

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
ILLINOIS	23.1	11,002	3.03	9.55	33.59	1.526	5.370
MONTANA	84.6	8,820	0.87	8.70	29.72	1.685	1.923
PENNSYLVANIA	74.3	12,927	1.47	6.81	42.63	1.649	2.217
W. VIRGINIA	21.3	12,880	1.01	7.83	40.39	1.568	1.529
TOTAL	203.3	10,989	1.35	8.01	35.99	1.643	2.396

TABLE 14-7 (CONTINUED)

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
GENOA	* 3	1969	352.6	PC	COAL	1,536,911	50	N.A.	1.85	9,990	705,000

* Company owns 50% of the station.

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
ILLINOIS	289.6	10,875	2.79	9.78	33.35	1.533	5.003
MONTANA	324.5	8,722	1.03	9.24	30.36	1.740	2.303
PENNSYLVANIA	304.5	12,950	1.54	6.77	42.27	1.632	2.319
W. VIRGINIA	54.5	12,364	1.16	7.71	39.98	1.617	1.830
TOTAL	973.1	10,889	1.72	8.54	35.51	1.631	3.080

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
MADGETT	1	1979	370.5	PC	COAL	1,411,451	43	N.A.	2.60	11,656	982,000

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
WYOMING	1,026.6	8,377	0.33	4.67	32.65	1.949	0.768

TABLE 14-7 (CONTINUED)

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
STONEMAN	1	1951	17.5	PC	COAL						
	2	1953	35.2	PC	COAL						
TOTAL			52.7			50,567	11	N.A.	2.90	14,676	30,000

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
ILLINOIS	7.7	10,705	3.23	10.70	33.93	1.585	5.884
PENNSYLVANIA	21.5	12,965	1.55	6.95	41.95	1.618	2.331
TOTAL	29.2	12,369	2.00	7.94	39.83	1.610	3.153

TOTAL CAPABILITY: 866 MEGAWATTS
COAL-FIRED CAPABILITY: 785 MEGAWATTS
TOTAL COAL PURCHASES: 2,232,200 TONS
ILLINOIS COAL PURCHASES: 320,400 TONS
TOTAL GENERATION: 3.0 BILLION KILOWATTHOURS
COAL-FIRED GENERATION: 2.7 BILLION KILOWATTHOURS

MADISON GAS AND ELECTRIC COMPANY

Madison Gas and Electric Company is an investor-owned utility involved in the generation, purchase and distribution of electricity, and the sale of natural gas. Madison sells electricity to 105,000 customers in a 250 square mile area of southern Wisconsin, with most of the total in the Madison area. The company employs 725. Madison Gas and Electric Company is headquartered in Madison, Wisconsin.

Electric sales are nearly two billion kilowatthours, valued at $125 million. Total kilowatthours sold ranks Madison as the fifth largest Wisconsin electric utility. Nationally, Madison is ranked 98th.

Madison owns one coal-fired generating station, located in Madison, Wisconsin. Madison also owns 22 percent (216 megawatts) of Wisconsin Power and Light Company's Columbia coal-fired station and 18 percent of Wisconsin Public Service Corporation's Kewaunee nuclear station (95 megawatts). Madison's total capability is 598 megawatts. The coal-fired capability totals 317 megawatts, or 53 percent of Madison's capability. Madison's coal-fired capability represents three percent of the state's total capability.

Madison has 1,400 miles of above ground power lines and 509 miles of underground lines. The company has electrical interconnections with Wisconsin Power and Light Company and Wisconsin Public Service Corporation.

Madison has electrical generation of approximately 1.8 billion kilowatthours. Coal accounts for 61 percent of the total generation. Statewide, Madison's generation represents four percent of total generation.

Madison purchased 36,000 tons of coal in 1986. Of this total, 3,000 tons of Illinois coal were purchased from one coal producer. For Wisconsin, Madison's Illinois coal purchase represents a small portion of the utility's total coal demand. Table 14-8 lists the Illinois coal purchase, quality of coal and delivered price for 1986. For the period of this study, Madison only purchased Illinois coal in 1986.

TABLE 14-8. MADISON'S ILLINOIS COAL PURCHASE, QUALITY OF COAL AND DELIVERED PRICE 1986.

YEAR	1986
THOUSAND TONS	3
PERCENT SULFUR	1.41
BTU/LB	11,211
$/TON	39.58
$/MMBTU	1.77

The following paragraphs describe Madison's one coal-fired station, while Table 14-9 provides additional data. Refer to Map 14-1 for the location of this station.

The **Blount Street Station** is located in Madison. The station consists of two older pulverized coal units with capability of 101 megawatts. The station represents 17 percent of Madison's total capability. The station's generation of 63 million kilowatthours represents seven percent of its capability and four percent of Madison's total generation. The production expense for the station is not available, but the fuel expense averages three cents per kilowatthour.

Blount Street consumed 47,000 tons of Illinois and Indiana coal in 1986. The coal averages 11,211 BTU per pound of coal and 1.4 percent sulfur. SO2 emissions are 2.5 pounds per million BTU of input. The Illinois coal is supplied through Zeigler Coal Company, by spot market. The coal is received by rail. The Indiana coal is supplied by Little Sandy Coal Company and Bicknell Minerals Incorporated, both by spot market.

TABLE 14-9
MADISON GAS AND ELECTRIC COMPANY
COAL-FIRED GENERATING STATION AND STATISTICS
1986

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
BLOUNT	6	1957	50.5	PC	COAL						
STREET	7	1961	50.2	PC	COAL						
TOTAL			100.7			62,657	7	N.A.	N.A.	16,819	47,000

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
ILLINOIS	3.0	11,421	1.72	6.37	42.75	1.872	2.937
INDIANA	33.0	11,192	1.38	8.00	39.29	1.755	2.404
TOTAL	36.0	11,211	1.41	7.86	39.58	1.765	2.453

TOTAL CAPABILITY: 598 MEGAWATTS
COAL-FIRED CAPABILITY: 317 MEGAWATTS
TOTAL COAL PURCHASES: 36,000 TONS
ILLINOIS COAL PURCHASES: 3,000 TONS
TOTAL GENERATION: 1.8 BILLION KILOWATTHOURS
COAL-FIRED GENERATION: 1.1 BILLION KILOWATTHOURS

WISCONSIN ELECTRIC POWER COMPANY

Wisconsin Electric Power Company (WEPC) is a holding company involved in the generation, purchase and distribution of electricity, sale of natural gas, and supply of steam for heating. WEPC sells electricity in eastern and northern Wisconsin and the upper peninsula of Michigan. The service territory covers approximately 12,600 square miles, with a population of more than two million. WEPC has about 843,000 customers. The company also supplies steam for heating to portions of downtown Milwaukee. The major economic activities consist of heavy equipment, motor vehicle bodies and parts, paper and paper products, agricultural equipment, meat packing, mining and agriculture. The company employs 5,200. WEPC is headquartered in Milwaukee, Wisconsin.

WEPC's electric sales are approximately 19 billion kilowatthours, valued at $1.1 billion. Total kilowatthours sold ranks WEPC as the largest Wisconsin electric utility. Nationally, WEPC is the 34th largest investor-owned utility.

WEPC has five coal-fired generating stations, located in southeastern Wisconsin. WEPC also owns 25 percent of Wisconsin Power and Light Company's Edgewater coal-fired Unit 5 (95 megawatts). The coal-fired capability totals 3,306 megawatts, or 72 percent of WEPC's total capability. The coal-fired capability represents 30 percent of the state's total capability. The majority of WEPC's remaining capability consists of one nuclear station with 970 megawatts of capability.

WEPC has 24,345 miles of above ground power lines. The company has electrical interconnections with Wisconsin Power and Light Company, Wisconsin Public Service Company, Madison Gas and Electric Company, Commonwealth Edison Company, Northern States Power Company, Upper Peninsula Power Company, Kaukauna-Menasha System and Cliffs Electric Service Company.

Wisconsin Electric Power Company has electrical generation of nearly 19 billion kilowatthours. Of this total, coal generation accounts for 59 percent. Statewide, the generation accounts for 44 percent of the total.

WEPC purchased 6.5 million tons of coal in 1986. Illinois supplies 1.2 million tons, or 18 percent of the total. All of the Illinois coal is used at the North and South Oak Creek Stations. WEPC's Illinois coal receipts represent seven percent of Wisconsin's total utility demand and 80 percent of Illinois coal receipts in Wisconsin. Table 14-10 lists WEPC's Illinois coal purchases for the past four years. Since 1983, WEPC's Illinois coal demand has decreased by 14 percent, while the delivered price has increased by 15 percent. The sulfur content has decreased by 33 percent since 1983.

TABLE 14-10. WEPC'S ILLINOIS COAL PURCHASES, QUALITY OF COAL AND DELIVERED PRICES 1983-1986.

YEAR	1983	1984	1985	1986
THOUSAND TONS	1,363	1,040	1,057	1,167
PERCENT SULFUR	2.33	2.36	2.17	1.55
BTU/LB	11,725	11,629	11,761	11,782
$/TON	36.76	41.95	43.30	42.67
$/MMBTU	1.57	1.80	1.84	1.81

The following paragraphs discuss WEPC's five coal-fired generating stations. Table 14-11 provides additional statistical data on these stations and systemwide data.

The North and South Oak Creek Stations are located in southern Wisconsin at Oak Creek. Both stations are adjacent to one another. The North Oak Creek station consists of four older pulverized coal units with capability of 410 megawatts. The South Oak Creek station has four pulverized coal units with 1,046 megawatts of capability. Both stations account for 32 percent of WEPC's total capability. The two stations' generation of 4.7 billion kilowatthours represents 37 percent of their capability. Of this generation, South Oak Creek accounts for 81 percent of the total. The average production expense per kilowatthour is three cents, with the fuel expense at 1.7 cents.

The 2.1 million tons of coal used in 1986 averages 11,951 BTU per pound of coal and 1.9 percent sulfur. The SO2 emission rate is 3.1 pounds per milion BTU of input. Nationally, they rank 35th in total tons of SO2 emissions. Both stations are rated very difficult for FGD retrofit because of limited space. The coal is supplied by four coal producing states. Illinois coal suppliers are Old Ben Coal Company under contract through 1988 and Amax Coal Company by spot market. The coal is received by railroad carrier. The Pennsylvania coal is supplied by Consolidation Coal Company, by spot market; the Indiana coal is supplied by Old Ben Coal Company, by spot market; and the Kentucky coal is supplied by Pittsburg and Midway Coal Company through contract.

The Pleasant Prairie Station is located at the southeastern tip of Wisconsin at Pleasant Prairie. The station has two pulverized coal units with capability of 1,160 megawatts. It is the largest WEPC station, accounting for 25 percent of WEPC's total capability. The station's generation of 5.2 billion kilowatthours represents 52 percent of its capability and 28 percent of the company's total generation. The production expense averages 2.1 cents per kilowatthour. The fuel expense averages 1.6 cents. It is WEPC's most efficient station.

The 3.6 million tons of Wyoming coal burned in 1986 averages 8,304 BTU per pound of coal and 0.3 percent sulfur. SO2 emissions are 0.7 pound per million BTU of input. Both units are using a compliance coal to meet the U.S. Environmental Protection Agency's New Source Performance Standard. The Wyoming coal is supplied by Carter Mining Company by contract through 2000, and Rochelle Coal Company and Cordero Mining Company, both by spot market.

The Port Washington Station is located in southeastern Wisconsin at Port Washington. It consists of five older pulverized coal units with capability of 328 megawatts. The station represents seven percent of WEPC's total capability. The station's generation of 0.4 billion kilowatthours accounts for 13 percent of its capability and two percent of WEPC's total generation. The average production expense per kilowatthour is not available, but the fuel expense averages 2.5 cents.

The 0.2 million tons of Pennsylvania coal used in 1986 averages 13,236 BTU per pound of coal and 1.5 percent sulfur. The SO2 emission rate is 2.3 pounds per million BTU of input. Nationally, the station ranks 111th in total tons of SO2 emissions. The station is rated very difficult for FGD retrofit because of limited space. The Pennsylvania coal is supplied by Emerald Mining Corporation by contract through 1992.

The Valley Station is located in southeastern Wisconsin at Milwaukee. It consists of two pulverized coal units with capability of 267 megawatts. It is the smallest WEPC station. The station represents six percent of the company's total capability. The station's generation of 0.7 billion kilowatthours accounts for 28 percent of its capability and four percent of WEPC's total generation. The average production expense per kilowatthour is not available. The fuel expense averages 2.7 cents per kilowatthour.

The 0.4 million tons of coal used in 1986 averages 12,803 BTU per pound of coal and 1.4 percent sulfur. SO2 emissions are 2.2 pounds per million BTU of input. Valley is ranked 120th nationally in total tons of SO2 emissions. The station is rated very difficult for FGD retrofit because of limited space. The Pennsylvania coal is supplied by Coal Associates Incorporated by contract.

TABLE 14-11
WISCONSIN ELECTRIC POWER COMPANY
COAL-FIRED GENERATING STATIONS AND STATISTICS
1986

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPABILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
NORTH OAK CREEK	1	1953	95.0	PC	COAL						
	2	1954	94.0	PC	COAL						
	3	1955	107.0	PC	COAL						
	4	1957	114.0	PC	COAL						
SOUTH OAK CREEK	5	1959	235.0	PC	COAL						
	6	1961	246.0	PC	COAL						
	7	1965	281.0	PC	COAL						
	8	1967	284.0	PC	COAL						
TOTAL			1,456.0			4,712,678	37	135	2.95	10,015	2,058,000

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
ILLINOIS	1,167.4	11,782	1.55	7.54	42.67	1.811	2.565
INDIANA	10.3	11,536	1.58	6.40	35.07	1.520	2.671
KENTUCKY	454.9	11,996	2.98	8.56	33.18	1.383	4.844
PENNSYLVANIA	137.6	13,276	1.52	6.19	37.25	1.403	2.233
TOTAL	1,770.2	11,951	1.92	7.69	39.77	1.664	3.133

TABLE 14-11 (CONTINUED)

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
PLEASANT	1	1980	580.0	PC	COAL						
PRAIRIE	2	1985	580.0	PC	COAL						
TOTAL			1,160.0			5,238,686	52	582	2.13	11,422	3,649,000

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
WYOMING	4,003.1	8,304	0.31	4.96	22.27	1.341	0.728

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
PORT	1	1935	49.0	PC	COAL						
WASHINGTON	2	1943	69.0	PC	COAL						
	3	1948	78.0	PC	COAL						
	4	1949	57.0	PC	COAL						
	5	1950	75.0	PC	COAL						
TOTAL			328.0			372,181	13	N.A.	N.A.	15,292	215,000

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	SO2 LB/MMBTU
PENNSYLVANIA	236.4	13,236	1.53	5.76	42.50	1.605	2.254

TABLE 14-11 (CONTINUED)

STATION	UNIT	ON LINE	SUMMER CAPABILITY (MW)	UNIT TYPE	FUEL	NET GENERATION (000 KWH)	CAPA-BILITY (%)	$/KW	COST CENTS/KWH	BTU/KWH	COAL CONSUMED (TONS)
VALLEY	1	1968	130.0	PC	COAL						
	2	1969	137.0	PC	COAL						
TOTAL			267.0			658,782	28	N.A.	N.A.	14,692	378,000

COAL SUPPLIER	QUANTITY (000 TONS)	BTU/LB	% S	% ASH	$/TON	$/MMBTU	S02 LB/MMBTU
PENNSYLVANIA	482.6	12,803	1.43	8.18	46.80	1.828	2.178

TOTAL CAPABILITY: 4,571 MEGAWATTS
COAL-FIRED CAPABILITY: 3,306 MEGAWATTS
TOTAL COAL PURCHASES: 6,492,300 TONS
ILLINOIS COAL PURCHASES: 1,167,400 TONS
TOTAL GENERATION: 18.7 BILLION KILOWATTHOURS
COAL-FIRED GENERATION: 11.0 BILLION KILOWATTHOURS

CHAPTER FIFTEEN

SUMMARY

The Illinois utility coal market is comprised of a 13 state region located in the midwestern and southeastern United States. In this region, 33 electric utilities used Illinois coal at 62 generating stations in 1986. This study provides detailed information on the demand for energy in this area, including the states supplying coal to each utility and generating station. The report further provides comparative data on coal sales since 1981.

The summary brings together much of this data in narrative and tabular form. It reviews relevant coal production data and briefly describes the existing market for Illinois coal. Finally, it analyzes certain key characteristics of the coal market and other factors which may influence the future market for Illinois coal.

ILLINOIS COAL PRODUCTION

Illinois is the fifth largest coal producing state in the nation, with about seven percent of the nation's total coal production. Illinois coal producers mined approximately 63 million tons of coal in 1986, an increase of about three million tons over 1985. The 51 mines in Illinois are operated by 22 coal companies, of which the top ten producers mine 58 million tons, or 92 percent of the total. The majority of the coal has a sulfur content greater than 2.5 percent, while only six percent of the coal is classified as a low sulfur coal.

The Illinois coal production has a mine value of approximately $1.9 billion. Mine employment is about 13,500. Compared to the previous year, the mine value of the coal is nearly the same, while mine employment decreased by nearly 1,300. The primary reasons why revenue stayed the same are reduced coal prices brought on by a surplus of coal, renegotiated coal contracts and a small increase in spot market coal purchases. The reduced mine employment results from a more competitive coal market and improvements in production efficiency. From 1985, the average production per mine employee per man-day increased by about ten percent.

About 65 percent of the coal production is taken from 31 underground mines and the remainder from 20 surface mines. The largest underground mine is Monterey Coal Company's Mine No. 2 with 3.3 million tons, while the largest surface mine is Arch of Illinois' Captain Mine with 6.3 million tons. Overall, underground mines produce an average of 1.3 million tons and the surface mines average 1.1 million tons. The 27 largest mines in Illinois account for 81 percent of the total production.

Peabody Coal Company continues to be the largest Illinois coal producer accounting for 16 percent of production. Due to recent expansions in operations, Consolidation Coal Company and Arch Mineral Corporation are a close second and third, with about 16 percent and 14 percent, respectively. Consolidation purchased Inland Steel Coal Company's two operating mines in southern Illinois, while Arch Mineral purchased Amax Coal Company's Leahy Mine in southern Illinois and opened the Horse Creek Mine near Pinckneyville. Many of the larger Illinois coal producers are major national producers. Table 15-1 lists the major Illinois coal producers, quantity of production and percent of Illinois coal production. The category of "All Others" consists of the remaining 12 companies and account for nearly eight percent of the total production.

TABLE 15-1. ILLINOIS COAL PRODUCERS, COAL PRODUCTION AND PERCENT OF ILLINOIS COAL PRODUCTION.

COMPANY	TONS (000)	% OF TOTAL
PEABODY COAL	10,175	16.1
CONSOLIDATION COAL	9,986	15.8
ARCH MINERAL	8,639	13.6
OLD BEN COAL	8,033	12.7
MONTEREY COAL	5,321	8.4
FREEMAN UNITED COAL	5,124	8.1
AMAX COAL	4,473	7.1
ZEIGLER COAL	2,992	4.7
KERR-MCGEE COAL	1,980	3.2
WHITE COUNTY COAL	1,463	2.4
ALL OTHERS	5,047	7.9
TOTAL	63,233	100.0

EXISTING MARKET FOR ILLINOIS COAL

The following paragraphs describe the Illinois utility coal market. Discussed is the geographic area of the market, the quantity and quality of the Illinois coal and the delivered prices in dollars per ton and per million BTU. The characteristics of the market, including its stability and value to the Illinois economy are also discussed.

The Illinois utility coal market is comprised of 13 states, located in the midwestern and southeastern United States. Illinois utilities receive 30 percent of the total utility sales. Outside of Illinois, Missouri utilities continue to be the largest consumers of Illinois coal with 23 percent of the total, followed by Indiana and Georgia. Utilities from the top five states purchased about 50 million tons, or 88 percent of utility sales, while the top eight states purchased 99 percent of the total. Illinois coal that is higher in BTU content and lower in sulfur content is sold in the out-of-state market. In recent years, approximately 90 percent of sales have been to the electric utility industry. Map 15-1 shows the Illinois utility coal market by state and quantity purchased in millions of tons. *

The delivered price of Illinois coal to Tennessee is the lowest at $1.23 per million BTU, while the most expensive is to Florida at $2.12 per million BTU. The average cost per million BTU dropped by three cents from $1.66 in 1985 to $1.63 in 1986. Utility coal sales also increased by five percent from the previous year. Table 15-2 lists the states where Illinois coal is consumed. Shown in the table is the quantity of coal purchased, the coal quality and delivered prices.

There are 19 states and three foreign countries that supplied 265.2 million tons of coal to the thirteen state region in 1986. The top five coal supplying states are: Kentucky with 74.6 million tons; Illinois--57.0 million tons; Wyoming--48.6 million tons; Indiana--25.3 million tons; and Alabama--16.4 million tons. These five states account for 84 percent of the total coal supply to this region. Rounding out the top ten coal supplying states are: Montana with 12.6 million tons; West Virginia--6.0 million tons; Virginia--5.4 million tons; Missouri--4.4 million tons; and Tennessee--4.3 million tons. Of the total supply, western coal producers account for 24 percent of the total, while the out-of-country suppliers (Canada, Colombia and South Africa) represent less than one percent.

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* The balance of Illinois coal sales, approximately six million tons, are to the industrial sector. The industrial customers are primarily located in Illinois, Indiana and Missouri.

MAP 15-1
ILLINOIS UTILITY COAL MARKET

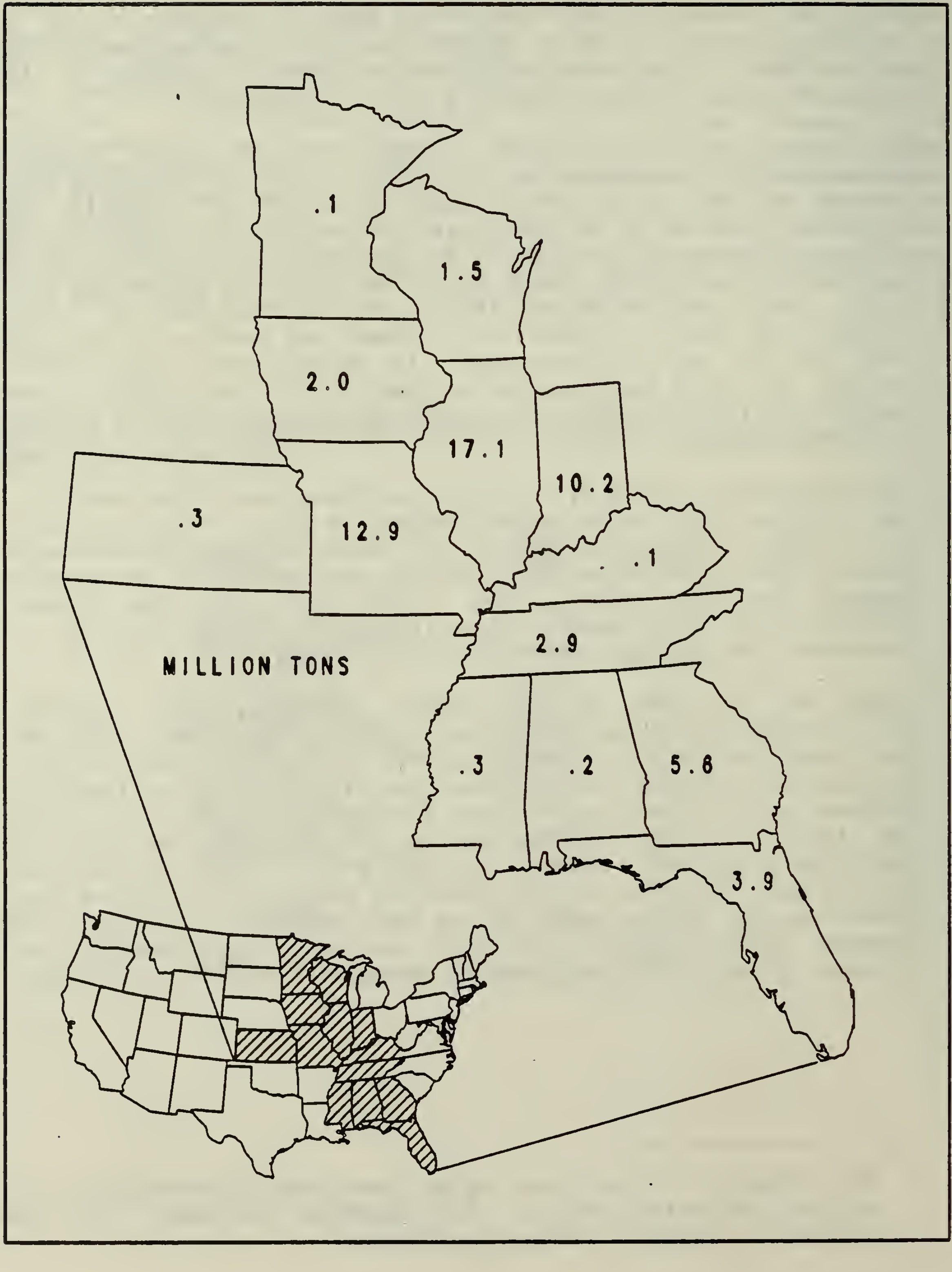


TABLE 15-2. ILLINOIS COAL SALES BY STATE AND QUANTITY AND QUALITY OF COAL.

STATE	TONS (000)	% OF TOTAL	BTU/LB	% SULFUR	$/TON	$/MMBTU
ILLINOIS	17,063	30	10,879	2.89	34.18	1.57
MISSOURI	12,854	23	11,139	2.37	35.46	1.59
INDIANA	10,214	18	10,751	2.68	35.89	1.67
GEORGIA	5,609	10	11,424	2.47	35.89	1.65
FLORIDA	3,935	7	11,616	2.76	49.33	2.12
TENNESSEE	2,915	5	11,749	1.89	28.77	1.23
IOWA	1,971	3	11,257	2.72	35.21	1.56
WISCONSIN	1,491	3	11,587	1.82	40.68	1.76
MISSISSIPPI	336	--	12.199	2.50	42.64	1.75
KANSAS	284	--	11,471	2.48	37.84	1.65
ALABAMA	149	--	12,062	.95	32.80	1.36
MINNESOTA	113	--	12,250	1.62	51.64	2.11
KENTUCKY	65	--	11,949	.90	34.70	1.45
TOTAL/AVERAGE	56,999	100	11,113	2.59	36.19	1.63

Of special interest is the stability in the Illinois coal market since 1981. For the period of this study, the 13 state market purchased almost 100 percent of the utility sales. Since 1983, the utilities discussed in this study received 98 percent of the total. Some utilities have left the market, but in total, the utilities that make up the 1986 Illinois coal market are the same as in previous years. Since 1981, Illinois coal producers sold 314.8 million tons of coal to the utility industry, representing about 87 percent of total Illinois coal production. Graph 15-1 compares the Illinois coal production to utility sales since 1981.

The demand for Illinois coal has remained fairly stable, except for 1981 when there was a major strike between the United Mine Workers of America and the Bituminous Coal Operators Association. Utility sales have remained in the range of 51 to 57 million tons, annually. Table 15-3 shows a modest decrease in sulfur content and a minimal increase in BTU content over the years. The delivered prices, except for 1981, have remained nearly constant at $1.60 per million BTU.

GRAPH 15-1
TOTAL PRODUCTION AND UTILITY SALES
1981-1986

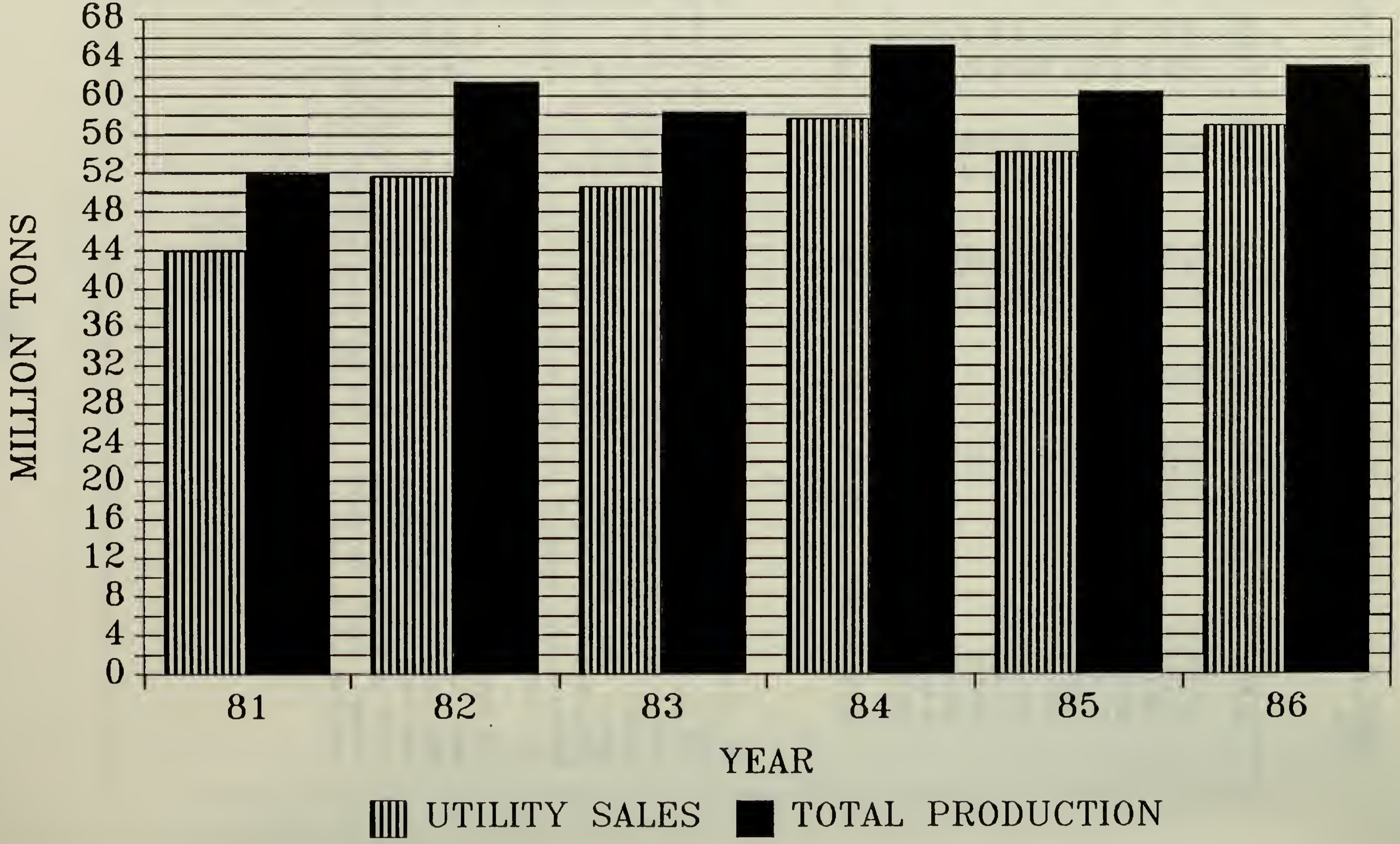


TABLE 15-3. ILLINOIS COAL SALES TO ELECTRIC UTILITIES, BY QUANTITY AND QUALITY, DELIVERED PRICE AND PERCENT OF PRODUCTION, 1981-1986.

YEAR	1981	1982	1983	1984	1985	1986
THOUSAND TONS	43,877	51,619	50,557	57,601	54,196	56,999
PERCENT SULFUR	2.70	2.70	2.70	2.70	2.60	2.59
BTU/LB	10,958	10,959	11,000	11,027	11,075	11,113
$/TON	31.98	34.35	35.30	36.05	36.80	36.19
$/MMBTU	1.46	1.57	1.60	1.63	1.66	1.63
% OF PRODUCTION	85	84	87	88	90	90

Of the 33 electric utilities that purchase Illinois coal, the top ten consume approximately 80 percent of the total. The largest users of Illinois coal are: Union Electric Company with 17 percent of total receipts; Illinois Power Company with 12 percent; Public Service Company of Indiana at 11 percent; Georgia Power Company at ten percent; and Central Illinois Public Service Company with seven percent. Of the top ten users, seven are located outside of Illinois. In total, these ten utilities purchased more than 44 million tons, or nearly 80 percent of Illinois utility coal sales. The seven out-of-state utilities listed in Table 15-4 purchased 55 percent of the total, and are identified by an asterisk.

TABLE 15-4. ILLINOIS COAL PURCHASES BY UTILITY, QUANTITY AND PERCENT OF TOTAL UTILITY PURCHASES.

UTILITY	NO. OF PLANTS	TONS (000)	% OF TOTAL
* UNION ELECTRIC COMPANY	4	9,616	17
ILLINOIS POWER COMPANY	4	6,847	12
* PUBLIC SERVICE OF INDIANA	2	6,444	11
* GEORGIA POWER COMPANY	3	5,609	10
CENTRAL IL. PUBLIC SERVICE	4	3,778	7
* TENNESSEE VALLEY AUTHORITY	6	3,128	5
* N. INDIANA PUBLIC SERVICE	3	2,768	5
COMMONWEALTH EDISON COMPANY	1	2,732	5
* ASSOCIATED ELECTRIC COOP	1	2,101	4
* SEMINOLE ELECTRIC COOP	1	1,435	3
TOTAL	29	44,458	79

* Out-of-state utilities.

The top ten coal-fired generating stations purchased almost 33 million tons or 57 percent of the Illinois coal sales in 1986. The top ten stations are listed in Table 15-5. The Baldwin, Kincaid and Coffeen stations are located in Illinois.

TABLE 15-5. TOP TEN ILLINOIS COAL CONSUMING STATIONS.

UTILITY	STATION	MILLION TONS
PUBL SERVICE OF INDIANA	GIBSON	6.2
UNION ELECTRIC COMPANY	LABADIE	5.0
ILLINOIS POWER COMPANY	BALDWIN	4.6
GEORGIA POWER COMPANY	WANSLEY	3.2
COMMONWEALTH EDISON COMPANY	KINCAID	2.7
UNION ELECTRIC COMPANY	RUSH ISLAND	2.5
TENN VALLEY AUTHORITY	JOHNSONVILLE	2.4
ASSOCIATED ELECTRIC COOP	NEW MADRID	2.1
CENTRAL IL PUBL SERVICE	COFFEEN	2.0
GEORGIA POWER COMPANY	YATES	1.9
TOTAL		32.6

Of the 62 stations where Illinois coal is utilized,** in-state coal sales (30% of total sales) are to 16 generating stations with about ten thousand megawatts of capability. These stations are owned by seven companies. Out-of-state sales are to 46 generating stations, with a total capability of approximately 37 thousand megawatts. These stations are operated by 26 utilities. The 47 thousand megawatts of electric capability where Illinois coal is utilized represents 16 percent of the nation's coal-fired capability.

As previously outlined, the utility coal market is very important to the Illinois coal industry. The utility industry consumes approximately 90 percent of Illinois' annual coal production. These sales result in employment of nearly 11,000 mine employees with an annual payroll of $362 million and total economic benefits of $1.2 billion. These figures are based on an average annual salary of $33,000 per mine employee (direct benefits) and an economic multiplier of 2.25. The multiplier takes into account jobs created to provide support service to a mine and additional income resulting from the spending of direct benefits.

** Table 15-7, located at the end of the summary, contains a listing of all the stations using Illinois coal. Included in the table is the name of the utility, in alphabetical order, name of generating station, quantity of Illinois coal used and percent of Illinois coal to the total quantity of coal used at each facility.

FACTORS AFFECTING THE FUTURE MARKET FOR ILLINOIS COAL

The future of the Illinois utility coal market will be influenced by a number of factors which are known today. Some of these events will clearly have a negative impact on the market, while some events could influence the market in a positive manner. Other factors are significant only in the context of acid rain legislation. These factors include:

- future coal-fired capability in the market region;
- future nuclear capability in the market region;
- the duration and quantity of Illinois coal contracts;
- the size of the spot market;
- the boiler type and age distribution of stations using Illinois coal;
- the SO2 and NOx emission rates at stations using Illinois coal;
- the ease or difficulty of retrofitting stations with emission control technologies; and
- the amount of capability already retrofitted with FGD.

These considerations are discussed below and illustrated in tables located at the end of the narrative. Their relevance to the future of the Illinois coal market is briefly analyzed.

Future Illinois coal sales will be very dependent on new coal-fired generating capability. Some coal-fired capability has been moved backwards on the utility industry's planning horizon. This is primarily the result of small increases in electrical demand and the additions to nuclear capability. (Approximately 11,000 megawatts of nuclear capability will be on-line over the next ten years). Table 15-6 lists the future coal-fired capability in the Illinois coal market. The table lists the name of the utility, the name of the station and unit(s), the megawatts of capability and projected in-service date. The future capability totals 6,930 megawatts with a potential market for coal of about 20 million tons, annually. No information is available concerning the burning of Illinois coal at these 11 facilities. However, only two of the utilities listed are presently using Illinois coal for electrical generation. These two utilities will need about four million tons of coal for these two stations when they come on-line.

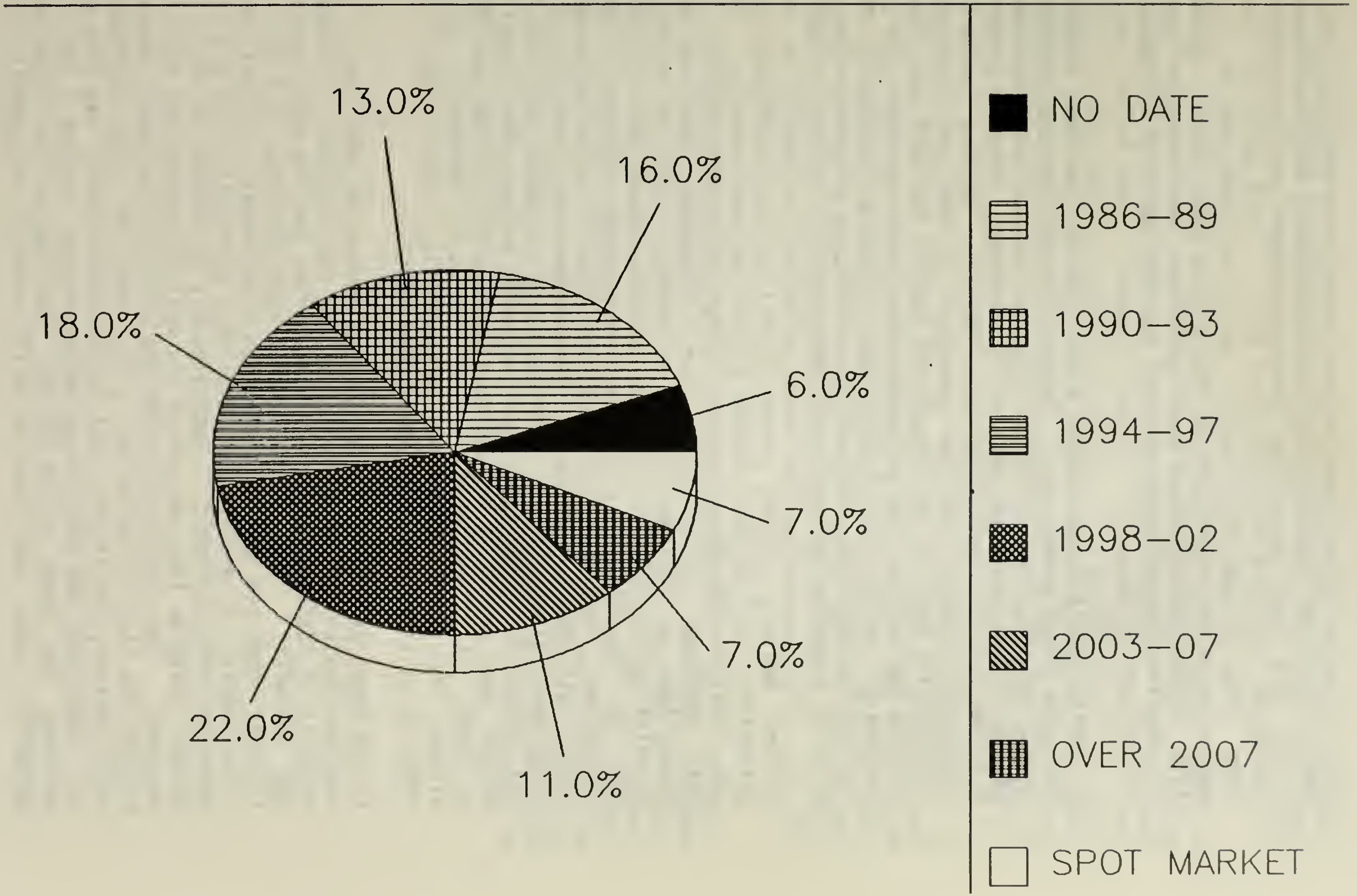
Historically, utilities have utilized high sulfur coal because of its heating value, delivered price and localized availability. In return for a guaranteed quantity and quality of coal from coal producers, utilities were willing to sign long-term contracts. Generally, the length of the contracts was the useful life of the generating station since a boiler was designed to burn a certain quality of coal and any variation in coal quality could reduce its economic and operational performance. For Illinois coal sales, approximately 93 percent of sales are by contract, with the remainder by spot market. Of importance is the time frame when many of these contracts will expire. Approximately 50 percent of the contract sales will terminate during a possible acid rain compliance period (1994-2002). Further, there are no guarantees that coal contracts will continue in the event of acid rain reductions. Unless best available control technologies are specified in a contract, a utility may be able to terminate a contract because of federal legislation.

Graph 15-2 illustrates the quantity of Illinois coal by type of sale. Included in the pie chart is the percentage of sales by contract and spot market. The quantity of Illinois coal is shown as: contracts with no expiration dates; contracts with expiration dates through 1989; contracts with expiration dates of 1990 through 1993; contracts with expiration dates of 1994 through 1997; contracts with expiration dates of 1998 through 2002; contracts with expiration dates of 2003 through 2007; and contracts with expiration dates later than 2007. As an example, 13 percent of the contract sales will terminate during 1990-1993. Also included is the quantity of Illinois coal sold by spot market. Spot market sales total four million tons, or seven percent of the total utility sales. Since 1981, spot market sales have stayed about the same. Based on contract sales as of 1986, a minimum of 58 percent of the contract sales (33 million tons) will be in effect after 1993. Prior to 1993, a minimum of 29 percent of the contract sales (17 million tons) will have expired. A minimum quantity is used since no termination dates are available for six percent of the contract sales.

Of the 62 stations using Illinois coal, 39 stations are using Illinois coal to meet at least 60 percent of their total coal demand. This will be of concern since many of these stations will be affected by acid rain legislation, if enacted. Of the 39 stations, 32 have no control technologies for reducing SO2 emissions. Further, 25 of these stations are listed in the top 200 SO2 emitting stations. Table 15-7 lists the stations using Illinois coal. Shown in the table is the name of the utility, the name of the generating station, the quantity of Illinois coal receipts and the percent of Illinois coal receipts to the total quantity of coal used at each facility. Overall, 59 percent of the coal used at the 62 stations comes from Illinois. Table 15-8 further lists the 40 generating stations using Illinois coal, by SO2 rank. The 40 stations are derived from the top 200 list prepared by Energy Ventures Analysis Incorporated. The ranking is based on estimated SO2 emissions as of 1980. Most acid rain proposals use 1980 as the base year for determining SO2 emissions. In the event of SO2 reductions, many of these stations will be forced to reduce their emissions by either installing FGD systems or using a low sulfur compliance coal. The table includes the name of the utility and generating station, its SO2 rank and the quantity of Illinois coal used at the facility. The 40 stations consume approximately 50 million tons annually, or 87 percent of Illinois utility coal sales.

Because of the large volume of Illinois coal going to many of the stations discussed above, Illinois coal mines are large in size and realize economies of scale. This implies that as Illinois coal mines increase their production, their average cost of production decreases. On average, Illinois' 20 largest underground mines produce over 1.7 million tons per year and the seven largest surface mines average 2.4 million tons per

GRAPH 15–2
COAL CONTRACT AND SPOT MARKET SALES PERCENT OF ILLINOIS COAL SALES



year. As for sales, many of these mines have less than three buyers for their coal, while some mines are dedicated to only one buyer. In the event that coal contracts are not renewed or cancelled, many coal producers may have to close their mines. Most acid rain studies do not take into account the loss of a major coal buyer and its impact on the economies of scale realized at these large mine sites. In many cases, a fifty percent reduction in sales could mean the closing of a mine because of the increased production costs and the inability to recover this cost in its coal price.

Illinois coal is burned in two types of utility boilers to generate steam for electrical generation. This is important in the event of acid rain reductions. Cyclone boilers produce a nitrogen oxide (NOx) emission rate of 1.4 to 1.8 pounds per million BTU of input, which is double the 0.7 to 0.9 emitted by pulverized coal boilers. Cyclone boilers will have difficulty meeting stricter standards for NOx emissions. NOx control technologies for cyclone boilers are limited and much more expensive than control technologies for pulverized coal boilers. Table 15-9 provides a listing of the 12 stations which have cyclone boilers using Illinois coal. The table includes the name of the utility, name of the station and unit(s), megawatts of capability and quantity of Illinois coal consumed.

Cyclone boilers consume almost 16 million tons of Illinois coal, while pulverized coal boilers consume 41 million tons annually. Tables 15-10 and 15-11 provide the megawatts of capability and quantity of Illinois coal purchased by each boiler type. The tables show the megawatts of capability and boiler age as of 1995, with and without flue gas desulfurization (FGD) and the associated quantity of Illinois coal. This is important in the event of sulfur dioxide (SO2) emission reductions. Many acid rain proposals call for a control program by the mid-to late-1990's. Should this be implemented, many plants because of their age, along with the cost of an FGD system may not retrofit with FGD and burn high sulfur coal, but switch to a low sulfur compliance coal, unless best available technology is mandated as an SO2 control strategy. In 1995, it is projected there will be 30,713 megawatts of capability without FGD that will be over 21 years old. This capability consumes about 35 million tons of Illinois coal annually.

In the event of federal legislation to reduce SO2 emissions, a number of stations (units) may be candidates for FGD retrofit. Included in this study is 34 stations that use Illinois coal and the cost consideration of FGD retrofit. Broken down by cost consideration, 8.3 million tons of Illinois coal are used at facilities rated easy; 15.2 million tons are rated modest; 11 million tons are rated difficult; and 5.5 million tons are rated very difficult. Approximately 25 percent of the Illinois coal market could be lost because of the unlikelihood of FGD retrofit at some stations. The consideration for FGD retrofit includes: the age of the boiler, the size of the boiler, site congestion, stack adjustments, boiler modifications, demolition, duct length requirements, gas flow adjustments, soil conditions and underground modifications, to name a few. Table 15-12 includes the name of the utility, the name of the station and unit number(s), cost consideration of FGD retrofit and quantity of Illinois coal receipts. These stations burn nearly 40 million tons of Illinois coal annually. The total quantity of Illinois coal by FGD cost consideration is shown at the bottom of Table 15-12 and listed as Table 15-12A.

Approximately 14 percent of the Illinois utility coal sales are to generating stations that currently meet federal/state SO2 emission standards. Sales to these stations are "somewhat protected" in the event of acid rain reductions. However, there is no guarantee that Illinois coal will always be used at these facilities. As an example, the coal contract with Hoosier Energy's Merom Station was terminated in 1987. Twelve stations equipped with FGD systems are presently using about eight million tons of Illinois coal annually. Table 15-13 provides a listing of the generating stations equipped with FGD systems and using Illinois coal.

In conclusion, the Illinois coal market will be impacted by a number of factors in the future. In meeting these concerns, the Illinois coal industry is becoming more price competitive through increased mine efficiency. However, many factors are beyond the control of the coal producer and include the growth in electrical demand, nuclear generation, transportation cost of the coal and federal and state laws. This study has been an attempt to provide the reader with an understanding of the Illinois coal market.

The final table in this study, Table 15-14, provides a detailed database on the 62 generating stations that use Illinois coal. The table includes the name of the utility; the name of the station; its location by state; the number of units in the station; the in-service dates for the oldest and newest units; the megawatts of capability; the percent of cyclone capability to the total capability of the station, if applicable; the megawatts of capability with an FGD system, if applicable; and the quantity of Illinois coal used at the facility. This table encompasses much of the data analyzed above and should be useful in obtaining an overall picture of the Illinois coal market.

TABLE 15-6. FUTURE COAL-FIRED CAPABILITY IN THE ILLINOIS COAL MARKET.

UTILITY	STATION AND UNIT	CAPABILITY (MW)	ON LINE
ALABAMA POWER	Miller 3	653	1989
	Miller 4	653	1991
ASSOCIATED ELECTRIC COOP	Watson 1	584	1997
E. KENTUCKY POWER COOP	Smith 1	602	1992
EMPIRE DIST ELECTRIC COMP	Riverton 1	72	PLANNED
GEORGIA POWER COMPANY	Scherer 4	755	1989
INDIANA AND MICHIGAN ELEC	Rockport 2	1,191	1988
JACKSONVILLE ELECTRIC AUTH	St. Johns River 2	629	1988
LOUISVILLE GAS & ELEC	Trimble County 1	526	1991
NORTHERN STATES POWER	Riverside 7	130	1987
	Sherburne 3	739	1987
ORLANDO UTIL COMMISSION	Stanton Energy 1	396	1987
TOTAL		6,930	

TABLE 15-7. GENERATING STATIONS USING ILLINOIS COAL, QUANTITY OF ILLINOIS COAL AND PERCENT OF ILLINOIS COAL TO TOTAL COAL DEMAND AT THE FACILITY.

UTILITY AND STATION	ILLINOIS COAL (000 TONS)	% OF IL. COAL TO TOTAL RECEIPTS
Associated Electric Cooperative		
New Madrid	2,101	100
Central Electric Power Cooperative		
Chamois	63	100
Central Illinois Light Company		
Duck Creek	897	100
Edwards	101	8
Central Illinois Public Service		
Coffeen	1,967	100
Grand Tower	340	100
Meredosia	600	100
Newton	871	56
Commonwealth Edison Company		
Kincaid	2,730	100
Will County	2	--
Dairyland Power Cooperative		
Alma	23	--
Genoa	290	30
Stoneman	8	28
Eastern Iowa Light and Power Cooperative		
Fair	97	78
Electric Energy Incorporated		
Joppa	1,183	51
Georgia Power Company		
Atkinson-McDonough	471	34
Wansley	3,231	71
Yates	1,907	63
Gulf Power Company		
Crist	1,282	76
Hoosier Energy Rural Electric Cooperative		
Merom	1,002	56

TABLE 15-7 (CONTINUED)

UTILITY AND STATION	ILLINOIS COAL (000 TONS)	% OF IL. COAL TO TOTAL RECEIPTS
Illinois Power Company		
Baldwin	4,587	100
Hennepin	1,010	100
Vermillion	493	78
Wood River	757	100
Interstate Power Company		
Dubuque	129	98
Kapp	434	86
Lansing	58	8
Iowa Electric Light and Power		
Prairie Creek	400	96
Sixth Street	67	100
Sutherland	24	11
Iowa-Illinois Gas and Electric Company		
Riverside	259	85
Iowa Southern Utilities Company		
Burlington	20	7
Kansas City Board of Public Utilities		
Kaw	79	100
Quindaro	205	100
Kansas City Power and Light Company		
Montrose	43	5
Madison Gas and Electric Company		
Blount	3	8
Mississippi Power Company		
Watson	336	17
Muscatine Power and Water Department		
Muscatine	484	100
Northern Indiana Public Service		
Bailly	677	82
Michigan City	749	82
Schahfer	1,342	72
Public Service Company of Indiana		
Gallagher	213	27
Gibson	6,231	89

TABLE 15-7 (CONTINUED)

UTILITY AND STATION	ILLINOIS COAL (000 TONS)	% OF IL. COAL TO TOTAL RECEIPTS
Rochester Department of Public Utilities		
Silver Lake	113	100
Seminole Electric Cooperative		
Seminole	1,435	49
Sikeston Board of Municipal Utilities		
Sikeston	242	80
Southern Illinois Power Cooperative		
Marion	737	100
Springfield City Water, Light and Power		
Dallman	710	100
Lakeside	77	100
Tampa Electric Company		
Big Bend	1,217	23
Tennessee Valley Authority		
Allen	434	29
Colbert	3	--
Cumberland	98	1
Johnsonville	2,383	77
Shawnee	65	2
Widows Creek	146	5
Union Electric Company		
Labadie	4,948	100
Meramec	473	89
Rush Island	2,549	100
Sioux	1,646	98
Utilicorp United, Incorporated		
Sibley	790	100
Wisconsin Electric Power Company		
Oak Creek	1,167	66
TOTAL	57,000 *	59

* Rounded

TABLE 15-8. TOP SO2 EMITTING STATIONS THAT USE ILLINOIS COAL, BY UTILITY, STATION AND NATIONAL RANK.

UTILITY	STATION	SO2 RANK	IL. COAL (000 TONS)
Tennesee Valley Authority	Cumberland	3	98
Public Service Company of Indiana	Gibson	4	6,231
Union Electric Company	Labadie	6	4,948
Illinois Power Company	Baldwin	7	4,587
Georgia Power Company	Wansley	13	3,231
Commonwealth Edison Company	Kincaid	14	2,730
Associated Electric Cooperative	Madrid	15	2,101
Kansas City Power and Light	Montrose	23	43
Central Illinois Public Service	Coffeen	24	1,967
Tampa Electric Company	Big Bend	27	1,217
Tennessee Valley Authority	Johnsonville	31	2,383
Tennessee Valley Authority	Colbert	33	3
Wisconsin Electric Power	Oak Creek	35	1,167
Tennessee Valley Authority	Shawnee	36	65
Union Electric Company	Sioux	40	1,646
Georgia Power Company	Yates	43	1,907
Electric Energy Incorporated	Joppa	45	1,183
Northern Indiana Public Service	Michigan City	63	749
Gulf Power Company	Crist	65	1,282
Tennessee Valley Authority	Allen	68	434
Tennessee Valley Authority	Widows Creek	75	146
Mississippi Power Company	Watson	77	336
Union Electric Company	Rush Island	79	2,549
Public Service Company of Indiana	Gallagher	85	213
Northern Indiana Public Service	Bailly	98	677
Central Illinois Public Service	Meredosia	103	600
Dairyland Power Cooperative	Genoa	105	290
Utilicorp United Incorporated	Sibley	118	790
Illinois Power Company	Hennepin	122	1,010
Georgia Power Company	McDonough	140	471
Interstate Power Company	Kapp	150	434
Illinois Power Company	Vermilion	155	493
Dairyland Power Cooperative	Alma	160	23
Springfield City Light & Power	Dallman	161	710
Union Electric Company	Meramec	164	473
Northern Indiana Public Service	Schahfer	169	1,342
Kansas City Board of Publ. Util.	Quindaro	174	205
Iowa Electric Light and Power	Sutherland	176	24
Southern Illinois Power Coop	Marion	180	737
Central Illinois Public Service	Grand Tower	188	340
TOTAL			49,835

TABLE 15-9. CYCLONE-FIRED BOILERS BURNING ILLINOIS COAL.

UTILITY	STATION UNIT(S)	MEGA-WATTS	IL. COAL (000 TONS)
Associated Electric Coop	Madrid 1-2	1,160	2,101
Central Electric Power Coop	Chamois 2	49	47
Central Illinois Public Service	Coffeen 1-2	875	1,967
Commonwealth Edison Company	Kincaid 1-2	1,108	2,730
Commonwealth Edison Company	Will County 1-2	299	2
Illinois Power Company	Baldwin 1-2	1,174	3,073
Iowa Electric Light and Power	Sutherland 3	80	13
Kansas City Board of Publ Util	Kaw 3	55	34
Kansas City Board of Publ Util	Quindaro 1	73	66
Muscatine Power and Water	Muscatine 8	79	148
Southern Illinois Power Coop	Marion 1-4	272	737
Northern Indiana Public Service	Bailly 7-8	480	677
Northern Indiana Public Service	Mich City 2-3-12	589	749
Northern Indiana Public Service	Schahfer 14	431	352
Springfield Water, Light and Pow	Dallman 1-2	174	339
Springfield Water, Light and Pow	Lakeside 6-7	80	77
Tennessee Valley Authority	Allen 1-3	873	434
Union Electirc Company	Sioux 1-2	900	1,646
Utilicorp United Incorporated	Sibley 1-3	461	790
TOTAL		9,212	15,982

TABLE 15-10. CYCLONE BOILER CAPABILITY IN MEGAWATTS AND AGE, AND ILLINOIS COAL SALES.

	AGE OF PLANT AS OF 1995 (IN YEARS)				
	10-15	16-20	21-25	26-30	OVER 30
MW W/OUT FGD:	--	1,011	2,859	3,297	1,875
ILLINOIS COAL SALES (000 TONS):	--	1,403	6,124	6,605	1,387
MW WITH FGD:	--	170	--	--	--
ILLINOIS COAL SALES (000 TONS):	--	461	--	--	--

TABLE 15-11. PULVERIZED COAL BOILER CAPABILITY IN MEGAWATTS AND AGE, AND ILLINOIS COAL SALES.

	AGE OF PLANT AS OF 1995 (IN YEARS)				
	10-15	16-20	21-25	26-30	OVER 30
MW W/OUT FGD:	--	8,652	8,039	1,822	12,821
ILLINOIS COAL SALES (000 TONS):	--	13,050	8,147	1,452	11,021
MW WITH FGD:	4,285	1,106	--	--	1,000
ILLINOIS COAL SALES (000 TONS):	5,137	2,139	--	--	83

TABLE 15-12. STATIONS USING ILLINOIS COAL AND COST CONSIDERATIONS FOR FGD RETROFIT.

UTILITY	STATION/UNIT(S)	COST CONSIDERATION	IL COAL (000 TONS)
Associated Electric Coop	Madrid 1-2	Modest	2,101
Central Il Publ Svce	Coffeen 1-2	Easy	1,967
Central Il Publ Svce	Grand Tower 3-4	Very Difficult	340
Central Il Publ Svce	Meredosia 1-3	Very Difficult	600
Commonwealth Edison	Kincaid 1-2	Modest	2,730
Dairyland Power Coop	Genoa 3	Very Difficult	290
Electric Energy Inc	Joppa 1-6	Modest	1,183
Georgia Power Company	McDonough 1-2	Difficult	471
Georgia Power Company	Yates 1-5	Difficult	847
Georgia Power Company	Yates 6-7	Easy	1,060
Gulf Power Company	Crist 4-5	Very Difficult	223
Gulf Power Company	Crist 6-7	Modest	1,059
Illinois Power Company	Baldwin 1-3	Modest	4,587
Illinois Power Company	Hennepin 1-2	Difficult	1,010
Illinois Power Company	Vermilion 1-2	Difficult	493
Interstate Power Company	Kapp 1-2	Difficult	434
Iowa Electric Light and Pow	Sutherland 1-3	Difficult	24
Kan City Brd of Publ Util	Quindaro 1-2	Difficult	205
Kansas City Power and Light	Montrose 1-3	Very Difficult	43
Mississippi Power	Watson 4	Difficult	116
Mississippi Power	Watson 5	Easy	220
Northern Ind Publ Service	Bailly 7-8	Difficult	677
Northern Ind Publ Service	Michigan City 12	Difficult	596
Public Svce of Indiana	Gallagher 1-4	Difficult	213
Public Svce of Indiana	Gibson 1-4	Easy	5,000
Southern Il Power Coop	Marion 1-3	Very Difficult	276
Springfield Light and Power	Dallman 1-2	Difficult	339
Tampa Electric Company	Big Bend 1-3	Modest	882

TABLE 15-12 (CONTINUED)

UTILITY	STATION/UNIT(S)	COST CONSIDERATION	IL COAL (000 TONS)
Tennessee Valley Authority	Allen 1-3	Difficult	434
Tennessee Valley Authority	Colbert 5	Easy	3
Tennessee Valley Authority	Cumberland 1-2	Easy	98
Tennessee Valley Authority	Johnsonville 1-10	Very Difficult	2,383
Union Electric Company	Labadie 1-4	Difficult	4,948
Union Electric Company	Meramec 1-2	Very Difficult	138
Union Electric Company	Meramec 3	Difficult	152
Union Electric Company	Meramec 4	Modest	183
Union Electric Company	Sioux 1-2	Modest	1,646
Utilicorp United Inc	Sibley 1-3	Modest	790
Wisconsin Electric Power	Oak Creek 1-8	Very Difficult	1,167
TOTAL			39,928

TABLE 15-12A. QUANTITY OF ILLINOIS COAL BY FGD COST CONSIDERATION.

COST CONSIDERATION:	EASY	MODEST	DIFFICULT	VERY DIFFICULT
IL COAL (000 TONS):	8,348	15,161	10,959	5,460

The cost consideration of FGD retrofit was taken from Evaluation of SO2 Emissions And The FGD Retrofit Feasibility At The 200 Top Emitting Generating Stations prepared by Energy Ventures Analysis Incorporated for the U.S. Environmental Protection Agency. FGD retrofit categories are: easy; modest; difficult; and very difficult. The "easy" rank means that the capital cost is from 1.0 to 1.3 times more expensive than an FGD system at a new 500 megawatt plant; "modest" costs from 1.3 to 1.6 times more; "difficult" costs from 1.6 to 1.9; and "very difficult" is greater than 1.9 times the capital cost of a new FGD system. The study states, "that it should be useful in determining the relative degree of difficulty of retrofitting FGD systems on these powerplants."

TABLE 15-13. STATIONS THAT ARE EQUIPPED WITH AN FGD SYSTEM AND USING ILLINOIS COAL.

UTILITY	STATION UNIT(S)	MEGA-WATTS	IL. COAL (000 TONS)
Central Illinois Light Company	Duck Creek 1	366	897
Central Illinois Public Service	Newton 1	550	871
Hoosier Energy Rur Electric Coop	Merom 1 & 2	920	1,002
Muscatine Power and Water	Muscatine 9	155	289
Northern Indiana Public Service	Schahfer 17-18	739	604
Public Service Co of Indiana	Gibson 5	620	1,230
Seminole Electric Coop	Seminole 1-2	1,210	1,435
Sikeston Board of Publ Util	Sikeston 1	212	242
Southern Illinois Power Coop	Marion 4	170	461
Springfield Water Light & Power	Dallman 3	190	371
Tampa Electric Company	Big Bend 4	429	335
Tennessee Valley Authority	Widows Creek 7-8	1,000	83
TOTAL		6,561	7,820

TABLE 15-14. GENERATING STATION STATISTICS AND ILLINOIS COAL DEMAND.

UTILITY AND STATION	LOCATION	NO. OF UNITS	ONLINE DATES	CAPABILITY (MEGAWATTS)	% CYCLONE CAPABILITY	FGD (MEGAWATTS)	IL. COAL (000 TONS)
Associated Electric Coop							
New Madrid	Missouri	2	72-77	1,160.0	100		2,100.9
Central Electric Coop							
Chamois	Missouri	2	53-60	66.0	74		63.0
Central Il Light Company							
Duck Creek	Illinois	1	76	366.0		366.0	897.0
Edwards	Illinois	3	60-72	740.0			101.0
Central Il Publ Service							
Coffeen	Illinois	2	65-72	875.0	100		1,967.1
Grand Tower	Illinois	2	51-58	177.0			340.0
Meredosia	Illinois	3	48-60	306.0			600.0
Newton	Illinois	2	77-82	1,110.0		550.0	870.9
Commonwealth Edison							
Kincaid	Illinois	2	67-68	1,108.0	100		2,730.0
Will County	Illinois	4	55-63	1,060.0	28		2.3
Dairyland Power Coop							
Alma	Wisconsin	5	47-59	185.5			23.1
Genoa	Wisconsin	1	69	352.6			289.6
Stoneman	Wisconsin	2	51-53	52.7			7.7
Eastern Iowa L&P Coop							
Fair	Iowa	2	59-67	65.0			96.8
Electric Energy Inc							
Joppa	Illinois	6	53-55	1,014.0			1,183.1

TABLE 15-14 (CONTINUED)

UTILITY AND STATION	LOCATION	NO. OF UNITS	ONLINE DATES	CAPABILITY (MEGAWATTS)	% CYCLONE CAPABILITY	FGD (MEGAWATTS)	IL. COAL (000 TONS)
Georgia Power Company							
Atkinson-McDonough	Georgia	2	63-64	506.5			470.9
Wansley	Georgia	2	76-77	1,729.9			3,230.8
Yates	Georgia	7	50-73	1,249.5			1,907.0
Gulf Power Company							
Crist	Florida	4	59-73	1,016.4			1,282.0
Hoosier Energy REC							
Merom	Indiana	2	82-83	920.0		920.0	1,001.9
Illinois Power Company							
Baldwin	Illinois	3	70-75	1,761.0	67		4,586.7
Hennepin	Illinois	2	53-59	298.0			1,010.3
Vermilion	Illinois	2	55-56	181.0			493.2
Wood River	Illinois	2	54-64	491.0			756.8
Interstate Power Company							
Dubuque	Iowa	3	29-59	78.0			128.6
Kapp	Iowa	2	47-67	504.9			434.3
Lansing	Iowa	4	48-77	319.0			57.6
Iowa El Light and Power							
Prairie Creek	Iowa	4	50-67	228.0			400.0
Sixth Street	Iowa	6	21-50	85.0			67.0
Sutherland	Iowa	3	55-61	143.5	56		24.0
Iowa-Illinois Gas & Elec							
Riverside	Iowa	2	49-61	172.6			259.0
Iowa Southern Utilities							
Burlington	Iowa	1	68	207.0			19.8

TABLE 15-14 (CONTINUED)

UTILITY AND STATION	LOCATION	NO. OF UNITS	ONLINE DATES	CAPABILITY (MEGAWATTS)	% CYCLONE CAPABILITY	FGD (MEGAWATTS)	IL. COAL (000 TONS)
KC Board of Publ Util							
Kaw	Kansas	3	55-62	129.0	43		79.1
Quindaro	Kansas	2	66-71	228.0	32		204.8
KC Power and Light Co							
Montrose	Missouri	3	58-64	460.0			42.6
Madison Gas and Elec							
Blount Street	Wisconsin	2	57-61	100.7			3.0
Mississippi Power Co							
Watson	Mississippi	2	68-73	762.6			335.5
Muscatine Pow and Water							
Muscatine	Iowa	3	59-82	259.4	30	155.1	484.3
Northern Ind Public Svce							
Bailly	Indiana	2	62-68	480.0	100		677.2
Michigan City	Indiana	3	50-74	589.0	100		748.9
Schahfer	Indiana	4	76-85	1,642.0	26	739.0	1,342.1
Public Svce Co of Ind							
Gallagher	Indiana	4	59-61	560.0			212.7
Gibson	Indiana	5	75-82	3,140.0		620.0	6,230.8
Rochester Publ Util							
Silver Lake	Minnesota	4	48-69	105.7			112.7
Seminole Electric Coop							
Seminole	Florida	2	83-84	1,210.0		1,210.0	1,435.0
Sikeston Board Mun Util							
Sikeston	Missouri	1	81	212.0		212.0	241.6

TABLE 15-14 (CONTINUED)

UTILITY AND STATION	LOCATION	NO. OF UNITS	ONLINE DATES	CAPABILITY (MEGAWATTS)	% CYCLONE CAPABILITY	FGD (MEGAWATTS)	IL. COAL (000 TONS)
Southern Il Power Coop							
Marion	Illinois	4	63-78	272.0	100	170.0	737.0
Springfield Water, L&P							
Dallman	Illinois	3	68-78	363.5	48	190.0	710.2
Lakeside	Illinois	2	61-65	79.5	100		77.4
Tampa Electric Company							
Big Bend	Florida	4	70-84	1,559.0		429.0	1,217.3
Tennessee Valley Auth							
Allen	Tennessee	3	64	873.0	100		433.7
Colbert	Alabama	5	54-65	1,276.0			3.0
Cumberland	Tennessee	2	72-73	2,538.0			98.1
Johnsonville	Tennessee	10	51-59	1,294.0			2,382.6
Shawnee	Kentucky	10	53-56	1,510.0			64.7
Widows Creek	Alabama	8	52-64	1,762.0		1,000.0	145.7
Union Electric Company							
Labadie	Missouri	4	70-73	2,216.0			4,948.0
Meramec	Missouri	4	53-61	869.0			473.0
Rush Island	Missouri	2	76-77	1,160.0			2,549.3
Sioux	Missouri	2	67-68	900.0	100		1,646.0
Utilicorp United, Inc							
Sibley	Missouri	3	60-69	461.1	100		790.0
Wisconsin El Power Co							
Oak Creek	Wisconsin	8	53-67	1,456.0			1,167.4
TOTAL		204		46,996.6		6,561.1	56,999.0

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